WEST DAVIS
CORRIDOR

Technical Memorandum 22: Syracuse Arts Academy Traffic Study

in support of the
Environmental Impact Statement

West Davis Corridor Project

Federal Highway Administration
Utah Department of Transportation

UDOT Project No. S-0067(14)0

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1.0 Purpose

The Federal Highway Administration in cooperation with the Utah Department of Transportation (UDOT) is preparing an Environmental Impact Statement (EIS) for the West Davis Corridor (WDC) Project. The purpose of this technical memorandum is to present the results of a traffic study performed to evaluate traffic circulation around the Syracuse Arts Academy in 2040 if WDC Alternative B is selected. The school is located on the southeast quadrant of the Antelope Drive/3000 West intersection in Syracuse.

Currently, WDC Alternative B proposes an interchange on Antelope Drive just east of the Syracuse Arts Academy. Because of the close proximity to the school, stakeholders provided comments regarding traffic operations and pedestrian safety if this interchange location is selected. This memorandum presents the results of the traffic study including existing conditions and future traffic conditions for the AM and PM peak traffic periods.

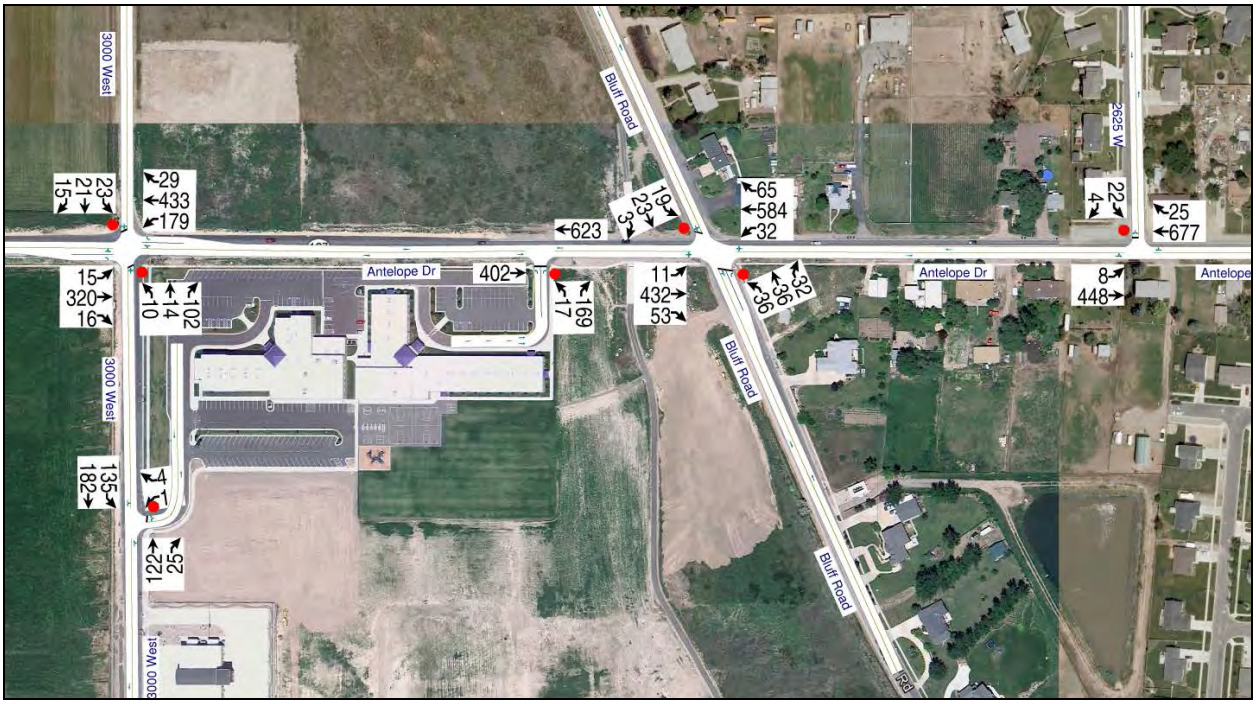
2.0 Existing Traffic Counts

Traffic counts were performed at five locations, including the school entrance and exit, during regular school days between April 25 and May 10, 2012. The PM peak traffic for the adjacent streets occurred from 4:30 PM to 5:30 PM, but for the school entrance and exit, it occurred from 3:00 PM to 4:00 PM.

For this study, these two PM peak periods were analyzed simultaneously as if they occurred at the same time to create a theoretical worst-case scenario. The AM peak for the adjacent streets corresponded to the peak school traffic from 7:45 AM to 8:45 AM. Figure 1 and Figure 2 below show the results of the traffic counts that were used to analyze existing conditions.

Figure 1. AM Peak Traffic in 2012

Figure 2. PM Peak Traffic in 2012



3.0 Existing Traffic Operations Analysis

Level of service (LOS) is a term used by the Highway Capacity Manual (HCM) to describe the traffic operations of an intersection and is based on congestion and delay. It ranges from LOS A (almost no congestion or delay) to LOS F (traffic demand is greater than capacity and the intersection experiences long queues and delay). LOS C or better is generally considered acceptable for rural intersections. LOS D or better is acceptable for urban intersections. LOS E is the threshold when the intersection reaches capacity.

For two-way stop-controlled intersections and T-intersections with a single stop, average intersection-wide delay and level of service are not defined by the HCM. Therefore, for these intersections, the approach with the highest delay will represent the intersection level of service. Table 1 shows the breakdown of intersection level of service definitions for stop-controlled and signalized intersections.

Table 1. Intersection Level of Service Definitions

Level of Service	Average Control Delay (sec/veh)	
	Stop-Controlled Intersection	Signalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

For this memorandum, the level of service delay calculations were performed using the Synchro and SimTraffic software packages. When analyzing the interaction between adjacent intersections, traffic simulation generally provides more realistic results than the traditional Highway Capacity Manual's deterministic methodology. Table 2 and Table 3 below summarize the existing level of service for the study intersections during the 2012 AM and PM peak hours based on the average of 11 SimTraffic model runs.

Table 2. AM Peak Level of Service in 2012

Intersection	Approach								Intersection	
	Eastbound		Westbound		Northbound		Southbound			
	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Highest Delay (sec)	LOS
3000 West and School Entrance	-	-	3.4	A	0.7	A	4.9	A	4.9	A
3000 West and Antelope Drive	1.9	A	6.3	A	19.4	C	22.6	C	22.6	C
School Exit and Antelope Drive	1.1	A	0.8	A	16.9	C	-	-	16.9	C
Bluff Road and Antelope Drive	2.0	A	1.7	A	23.4	C	32.6	D	32.6	D
2625 West and Antelope Drive	0.5	A	0.3	A	-	-	12.6	B	12.6	B

Table 3. PM Peak Level of Service in 2012

Intersection	Approach: Eastbound Average Delay (sec)	Eastbound LOS	Westbound Average Delay (sec)	Westbound LOS	Northbound Average Delay (sec)	Northbound LOS	Southbound Average Delay (sec)	Southbound LOS	Intersection Highest Delay (sec)	Intersection LOS
3000 West and School Entrance	-	-	3.8	A	0.3	A	2.7	A	3.8	A
3000 West and Antelope Drive	1.5	A	4.3	A	8.0	A	14.4	B	14.4	B
School Exit and Antelope Drive	0.8	A	1.2	A	7.1	A	-	-	7.1	A
Bluff Road and Antelope Drive	1.2	A	2.1	A	17.4	C	28.0	D	28.0	D
2625 West and Antelope Drive	0.5	A	0.6	A	-	-	13.7	B	13.7	B

As shown in Table 2 and Table 3 above, the operating conditions for the study intersections in 2012 range between LOS A and LOS D. There is only a single approach that operates at LOS D, which is the southbound direction of the Bluff Road and Antelope Drive intersection during the AM and PM peaks.

4.0 Future Traffic Volumes and Proposed Geometry

The B Alternatives under evaluation for the WDC EIS propose an interchange on Antelope Drive just east of the Syracuse Arts Academy. Both 3000 West and Bluff Road would require realignment, and the current school exit on Antelope Drive would need to be relocated due to the proximity of the interchange. Figure 3 and Figure 4 below show the proposed geometry with the AM and PM peak traffic volumes in 2040. The volumes were estimated based on current travel patterns and the results from the Wasatch Front Regional Council's travel demand model (version 8.1). It should be emphasized that this proposed geometry is not the final design, but it does provide a basis for analyzing the possible traffic impacts of the WDC.

Figure 3. AM Peak Traffic Volumes and Proposed Geometry in 2040

Figure 4. PM Peak Traffic Volumes and Proposed Geometry in 2040

5.0 Future Traffic Operations Analysis

Similar to the level of service delay calculations for existing conditions, the AM and PM level of service delays in 2040 were calculated using the Synchro and SimTraffic software packages. The 3000 West intersection and both ramp intersections along Antelope Drive were assumed to meet signal warrants and to be signalized by 2040. Table 4 and Table 5 show the results of the traffic operations analysis based on the average of 11 SimTraffic model runs.

Table 4. AM Peak Level of Service in 2040

	Approach									
	Eastbound		Westbound		Northbound		Southbound		Intersection	
Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
3000 West and School Exit	-	-	9.9	A	0.7	A	0.1	A	9.9	A
3000 West and School Entrance	-	-	-	-	0.4	A	17.9	C	17.9	C
3000 West and Antelope Drive	14.2	B	16.4	B	14.8	B	15.7	B	15.1	B
Southbound Ramps and Antelope Drive	6.0	A	6.2	A	-	-	18.0	B	6.6	A
Northbound Ramps and Antelope Drive	3.0	A	4.1	A	15.2	B	-	-	4.3	A
Realigned Bluff Road and Antelope Drive	1.8	A	0.4	A	21.5	C	9.4	A	21.5	C

Table 5. PM Peak Level of Service in 2040

	Approach									
	Eastbound		Westbound		Northbound		Southbound		Intersection	
Intersection	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
3000 West and School Exit	-	-	7.1	A	0.5	A	0.3	A	7.1	A
3000 West and School Entrance	-	-	-	-	0.2	A	2.2	A	2.2	A
3000 West and Antelope Drive	14.4	B	9.9	A	12.1	B	25.7	C	12.1	B
Southbound Ramps and Antelope Drive	6.3	A	8.3	A	-	-	19.3	B	8.3	A
Northbound Ramps and Antelope Drive	8.4	A	9.6	A	18.2	B	-	-	11.2	B
Realigned Bluff Road and Antelope Drive	2.2	A	0.7	A	33.8	D	13.0	B	33.8	D

With the proposed geometry described above, all evaluated intersections and all approaches within the intersections (with the exception of one) are projected to operate at LOS C or better in 2040 for both the AM and PM peak periods. The one exception being the northbound leg of the realigned Bluff Road and Antelope Drive intersection which is stopped controlled and has the potential to warrant a signal in the future. Large queuing at the school entrance was occasionally observed in the traffic simulation models because so much traffic arrives within a relatively short period of time during the AM peak. However, the models show that these queues would dissipate quickly and would not cause severe delays.

6.0 Pedestrians

Pedestrian counts were performed concurrent with the traffic counts described previously in this memorandum. The peak pedestrian counts occurred at the two school access intersections when the school let out between 3:00 PM and 4:00 PM. The other intersections were counted during the peak traffic hour between 4:30 PM and 5:30 PM and had a lot fewer pedestrians.

During the AM peak, all study intersections had high pedestrian counts, and the models showed that pedestrians generally traveled to the school from the east and from the south. Pedestrian movement during the PM peak was in the reverse direction, with pedestrians generally traveling to the east and to the south from the school. Table 6 shows the pedestrian count summary.

Table 6. Pedestrian Count Summary

Intersection	Pedestrian Direction			
	Northbound	Southbound	Eastbound	Westbound
2012 AM				
3000 West School Entrance	61	3	0	0
3000 West and Antelope Drive	0	0	7	5
Antelope Drive School Exit	0	0	5	42
Bluff Road and Antelope Drive	0	0	2	59
2625 West and Antelope Drive	0	0	8	40
2012 PM				
3000 West School Entrance	11	94	0	0
3000 West and Antelope Drive	2	1	11	10
Antelope Drive School Exit	4	0	105	14
Bluff Road and Antelope Drive	1	1	4	4
2625 West and Antelope Drive	0	1	5	11

The pedestrian counts were included in the Synchro/SimTraffic files described above in the existing and future traffic analyses. The pedestrian volumes on 2040 were assumed to increase 20% from the existing volumes, which is consistent with the traffic volume growth.

Currently, the Syracuse Arts Academy's Student Neighborhood Access Program (SNAP) states, "Crossing 1700 South is discouraged unless using [the] crossing at the intersection of 2000 W and 1700 S or by using [the] underpass along Bluff Road." The intersection of 2000 West and 1700 South (Antelope Drive) is a signalized intersection, but it is nearly 1 mile east of the school. It is expected that the overall SNAP will remain basically the same with the WDC, except there will be additional opportunities to cross Antelope Drive.

With WDC Alternative B, up to three new signals would be installed near the school, which would provide additional locations for pedestrians to cross Antelope Drive. The pedestrian underpass just west of Bluff Road would likely be moved because it is in direct conflict with the WDC alignment; however, the WDC Project would be required to provide the underpass.

Pedestrians are expected to cross Antelope Drive at either a signalized intersection or the underpass.

All WDC design features will be built to meet UDOT and AASHTO (American Association of State Highway and Transportation Officials) safety guidelines for pedestrians.

7.0 Conclusion

If WDC Alternative B is selected as the preferred alternative, a new interchange will be installed just east of the Syracuse Arts Academy. This will require the realignment of 3000 West, Bluff Road, and the school exit currently located on Antelope Drive.

All study intersections and all approaches within the intersections are expected to operate at LOS C or better in 2040, but up to three additional signals would be required along Antelope Drive to serve the projected 2040 traffic volumes. These signals would provide additional opportunities for pedestrians to cross Antelope Drive.

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