

**Appendix B-2. Access Evaluation for Proposed New
Junior High School**

**ACCESS EVALUATION FOR
THIRD JUNIOR HIGH SCHOOL ON SIGNATURE SITE
Davis, California**

Prepared For:

JONES & STOKES ASSOCIATES
2600 V Street
Sacramento, CA 95818

Prepared By:

kdANDERSON Transportation Engineers
417 Oak Street
Roseville, CA 95678
(916) 786-5529

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THIRD JUNIOR HIGH SCHOOL ON SIGNATURE SITE
Davis, California

INTRODUCTION

This report summarizes **kdANDERSON Transportation Engineers'** assessment of the access requirements associated with developing the Third Junior High School in Davis on the Signature site. The anticipated project would house 800 students and would served the eastern and southern areas of Davis.

This report describes the quality of traffic flow and the extent of needed improvements at school access under year 2010 conditions. Background traffic volumes were developed by interpolating daily traffic volume forecasts presented in the GPU DEIR based on observation of current a.m. peak hour traffic. Trip generation estimates have been made for the school using data published by the Institute of Transportation Engineers, as well as data developed from observation for other Jr High Schools. Year 2010 Plus Jr High School traffic volumes have been assessed to determine peak period traffic conditions at school access, to evaluate the need for traffic signals and to identify access design requirements.

PROJECT DESCRIPTION

Site Alternatives. Two alternatives for site development have been evaluated. The first alternative assumes development on the "western" portion of the site. A single access onto Covell Blvd would be created under this alternative. The second alternative locates the school in the northeaster corner of the site. Under this plan access would be provided to both Covell Blvd and Mace Blvd via a loop street that would circle the southern and western school boundaries. Under the western alternative the balance of the Signature site would likely remain in urban reserve through the General Plan's year 2010 planning horizon. Under the eastern alternative it has been conservatively assumed that the creation of the new loop street would accommodate development of the adjoining 45 acres, and for this analysis 180 single family residences have been assumed to be developed in this area.

Trip Generation. The amount of vehicular traffic generated by schools is dependent on their proximity to residential neighborhoods, the availability of pedestrian and bicycle facilities and parental commute patterns. Schools served by convenient and secure bicycle and pedestrian facilities typically generate less traffic than similar schools lacking safe routes for children.

The Institute of Transportation Engineers publishes trip generation rates for a variety of land uses based on observations made nation-wide. For Junior High schools reported a.m. peak hour trip generation rates range from 0.14 to 1.29 automobile trips per student, with an average rate of 0.46 a.m. peak hour trips per student.

Over the last year this consultant has had the opportunity to monitor automobile traffic at other middle and Jr High schools lacking safe pedestrian and bicycle access. For example, nearly all students are driven or bussed to E.V. Cain School in Auburn. We observed the a.m. peak hour trip generation rate at this school to be 0.68 trips per student.

For this analysis we have assumed that the trip generation at the Signature site will be dependent on the extension of adequate bicycle and pedestrian facilities to the site. Without the extension of these services, a rate of 0.68 trips per student is anticipated. If adequate bicycle and pedestrian routes are created, the average ITE rate (i.e., 0.46 trips per student) has been assumed.

City staff have reviewed the pedestrian and bicycle system in the study area and determined that the following elements would comprise a functionally adequate system to serve the Signature site:

For the "western" school site:

- Bike path connection from the school site to the existing bike path in the greenbelt running north-south along the eastern edge of the Mace Ranch Park development;
- Extension of the bike path along the south side of Covell Blvd to the east end of the school site, and
- Extension of the bike path along the west side of Mace Blvd, around the curve (other alignments would be considered) to the school site.

For the "eastern" alternative:

- Bike path connection from school site to existing bike path in the greenbelt running north-south along the eastern edge of the Mace Ranch Park, and
- Extension of the bike path along the west side of Mace Blvd, around the curve (other alignments would be considered) to the school site. Assume bike path across the entire school site.

**TABLE 1
TRIP GENERATION RATES**

LAND USE (ITE Code)	DAILY RATE	AM PEAK HOUR RATE
Jr High School (522)	1.45 trips per student	0.46 trips per student per hour
E.V Cain School, Auburn	not available	0.68 trips per student per hour

**TABLE 2
TRIP GENERATION VOLUMES**

LAND USE	DAILY TRIPS	AM PEAK HOUR TRIPS		
		IN	OUT	TOTAL
800 student school with adequate bicycle / pedestrian	1,160	210	158	368
800 student school without adequate bicycle / pedestrian	not available	310	234	544

The p.m. peak hour was not evaluated because the p.m. peak hour of school traffic and p.m. peak hour of the adjacent street traffic do not occur at the same time and are not cumulative. Therefore, the a.m. peak hour represents the "worse case" scenario when the school is adding traffic to the street system.

While these forecasts are indicative of the total traffic volume occurring over an hour, school traffic is typically concentrated into relatively short periods immediately before school begins and after school lets out for the day. For this analysis of access requirements it has been assumed that all school traffic will be concentrated into a thirty minute period before school starts.

Trip Distribution. Most of the a.m. peak hour trips destined for the new Jr High School will originate in residences within the school's service area. While the distribution of residences is one factor, the proximity to school and the presence of bicycle / pedestrian facilities is also important in determining the distribution of automobile trips.

The anticipated school service area is indicated in the Appendix. As shown, this school will serve South Davis as well as most of the community east of Pole Line Road. Using the land use data base developed for the GPU DEIR traffic model, the number of residential units within this area in

the year 2010 was determined. Based on review of the area street system, the areas most likely to travel to the school via Covell Blvd were separated from those areas likely to arrive via Mace Blvd. As shown in Table 3, about 53% of the residences in the service area are located in areas that would likely use Covell Blvd, while 47% are in areas best served by Mace Blvd.

**TABLE 3
TRIP DISTRIBUTION TO AND FROM THE SITE**

TRIP DESCRIPTIONS	Residential Distribution	Percentage of AM Trips	
		with Adequate Bicycle / Pedestrian Facilities	without Adequate Bicycle / Pedestrian Facilities
Trips originating from the west via Covell Blvd	53%	36%	53%
Trips originating from the south via Mace Blvd	47%	64%	47%

The automobile trip distribution will however reflect modal choice. While many children living west of the school would walk or ride bicycles if adequate facilities are available, residents of south Davis are much more likely to bus their children or drive them to school. For this analysis we have assumed that without adequate bicycle and pedestrian facilities, the automobile distribution will likely mirror the distribution of residences. However, if these facilities are available, then South Davis residents are twice as likely to drive their children to school as parents living west of the school. The resulting distribution is shown in Table 3.

YEAR 2010 TRAFFIC CONDITIONS

Background Traffic Conditions. The current daily traffic volume on this portion of Covell Blvd - Mace Blvd between the two Alhambra Blvd intersections is about 8,000 ADT. The traffic volume in this area is substantially less than that reported at locations on Covell Blvd closer to Pole Line Road and on Mace Blvd near the I-80 interchange. Under Year 2010 conditions, the GPU DEIR suggests that this same area will carry about 10,000 ADT.

Year 2010 a.m. peak hour background traffic was determined based on review of existing data for various locations along Covell Blvd - Mace Blvd. About 7.5% of the total daily traffic typically occurs during the a.m. peak hour. In the area of the school site the directional distribution during the a.m. peak hour is 80% eastbound and 20% westbound.

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Year 2010 Plus Jr High School Traffic Volumes. Figures 1 and 2 present a.m. peak hour traffic volumes based on the background traffic identified above and the project trip generation presented earlier. These volumes have been used to evaluate peak period operating conditions at each access. In each case, applicable peak hour factors have been used to approximate conditions occurring during 15 minute period containing the highest traffic volume.

Standards of Significance. The adequacy of site access was first evaluated assuming that traffic signals were not installed. The Level of Service projected for each individual intersection turning movement was determined and the theoretical average delay experienced during the peak 15 minutes was computed. The Draft GPU established LOS "E" as the limit of acceptable traffic operations, and this value has been employed to judge the adequacy of peak period traffic conditions at the school access as well.

In standard circumstances the need for traffic signals is also predicated on the satisfaction of criteria established by Caltrans. These criteria, called "warrants" consider a range of circumstances which would justify signalization, including traffic volumes, accident history, and in the case of school, pedestrian crossing volume.

Forecast Traffic Conditions. As indicated in Table 4, if traffic signals are not installed, very long delays can be expected during the peak morning period with the western (i.e., single access) alternative regardless of the presence or absence of bicycle facilities (i.e., with either 0.46 or 0.68 automobile trips per student). If the eastern alternative is selected and adequate bicycle and pedestrian facilities are in place (i.e, 0.46 trip per student), resulting Levels of Service do not exceed LOS "D". However, without adequate bicycle and pedestrian facilities (i.e, 0.68 trips per student), the Level of Service for outbound left turns at the Covell Blvd access could reach LOS "F" under the eastern alternative.

The extent to which forecast traffic volumes satisfy traffic signal warrants was also considered. In this case, the volume of traffic occurring with a single access and the higher trip generation assumption would satisfy Caltrans' peak hour traffic warrant. The volumes accompanying the other access alternative would not.

Evaluation of Alternatives. Alternatives for providing adequate school access have been evaluated.

Widening Covell Blvd and/or Mace Blvd. The preceding calculations assume that Covell Blvd - Mace Blvd remained two lane roads with auxiliary turn lanes provided at the school access. While widening each road to a four lane section per the General Plan would increase the capacity of the road, because the street would be wider the delays experienced by turning traffic would not be appreciably different. The need for traffic signals would remain, and as was shown in Table 4, satisfactory Levels of Service can be provided at the signalized access without widening the road to four lanes.

Roundabouts. The City has pursued the use of roundabouts in lieu of traffic signals at some intersections in Davis. Each of these locations could be a candidate for roundabouts, however, the use of this form of traffic control at isolated locations on a high speed road may not be applicable. Because traffic travels through a roundabout at 15 to 20 mph, their use on a high speed road may be problematic.

TABLE 4

INTERSECTION	AM PEAK HOUR LEVEL OF SERVICE AND AVERAGE DELAY (WITH 0.48 TRIPS PER STUDENT)					
	SINGLE ACCESS (WEST ADT)			DUAL ACCESS (EAST ADT)		
	Ave Delay	LOS	Warrants Met?	Ave Delay	LOS	Warrants Met?
	Covell Blvd / West Access WB left NB left NB right <i>WITH SIGNAL</i>	9.7 sec 516.4 sec 8.9 sec <i>16.2 sec</i>	B F B <i>C</i>	No	5.6 sec 28.6 sec 6.0 sec <i>6.7 sec</i>	B D B <i>B</i>
Mace Blvd / East Access NB left EB left EB right <i>WITH SIGNAL</i>	n/a			7.5 sec 26.3 sec 10.9 sec <i>11.1 sec</i>	B D C <i>B</i>	No

INTERSECTION	AM PEAK HOUR LEVEL OF SERVICE AND AVERAGE DELAY (WITH 0.68 TRIPS PER STUDENT)					
	SINGLE ACCESS			DUAL ACCESS		
	Ave Delay	LOS	Warrants Met?	Ave Delay	LOS	Warrants Met?
	Covell Blvd / West Access WB left NB left NB right <i>WITH SIGNAL</i>	20.0 sec >999 sec 11.6 sec <i>19.0 sec</i>	C F C <i>C</i>	Yes	6.1 sec 62.6 sec 6.0 sec <i>9.0 sec</i>	B F B <i>B</i>
Mace Blvd / East Access NB left EB left EB right <i>WITH SIGNAL</i>				10.5 sec 43.9 sec 15.1 sec <i>12.1 sec</i>	C E C <i>B</i>	No

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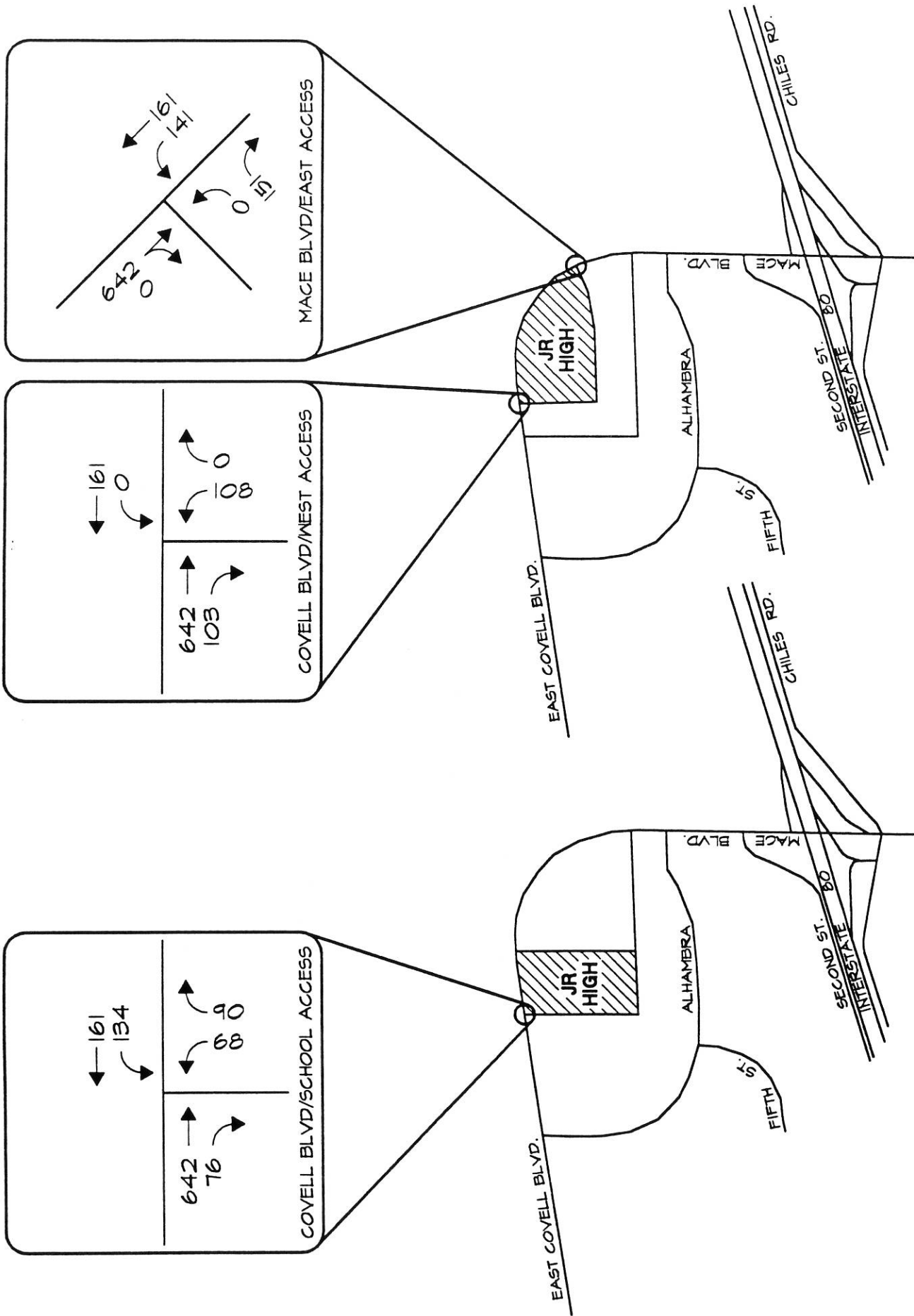
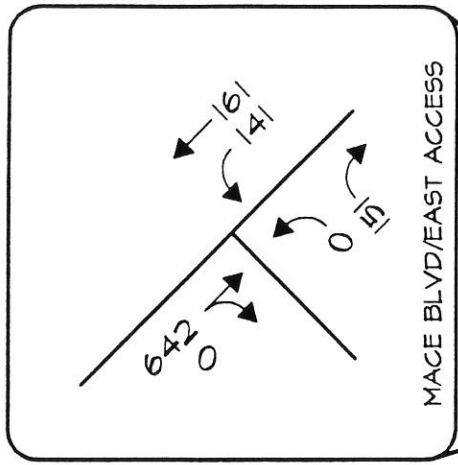
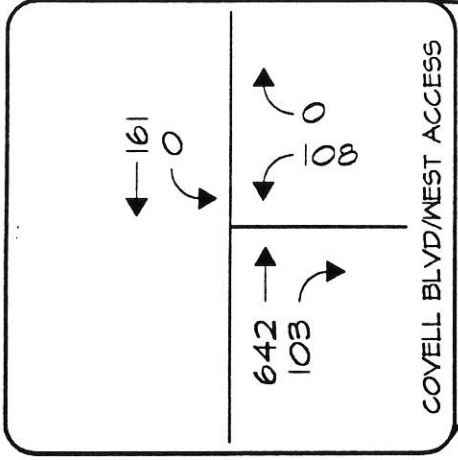
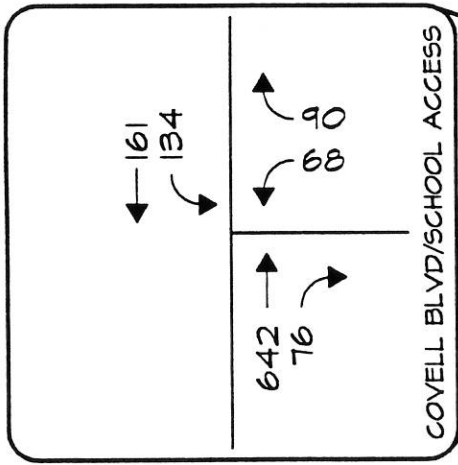
All-Way Stop Signs. All-Way stop sign controls function similarly to traffic signals and are less costly. However, their use is typically justified by the satisfaction of specific Caltrans warrants based on the presence of side street traffic throughout the day. All-Way stops are also susceptible to long delays and extreme queues during periods of high peak traffic. In this case, very long queues would be likely on the eastbound Covell Blvd approach during the morning peak period unless Covell Blvd was widened to a four lane section through the intersection. All-way stop control is not likely to be feasible due to the delays involved, the speed of traffic on Covell Blvd and the lack of side street traffic during most hours of the day.

Traffic Signals. Traffic signals could be an appropriate traffic control measure and may prove to be necessary depending on the actual traffic volume level and access alternative selected. Based on the Level of Service analysis presented earlier it is likely that a traffic signal will be needed if only one access is developed to the school. The need for signalization for a site plan with two access points is dependent on the level of non-automotive facilities provided, the resulting traffic volumes and the realization of background traffic growth.

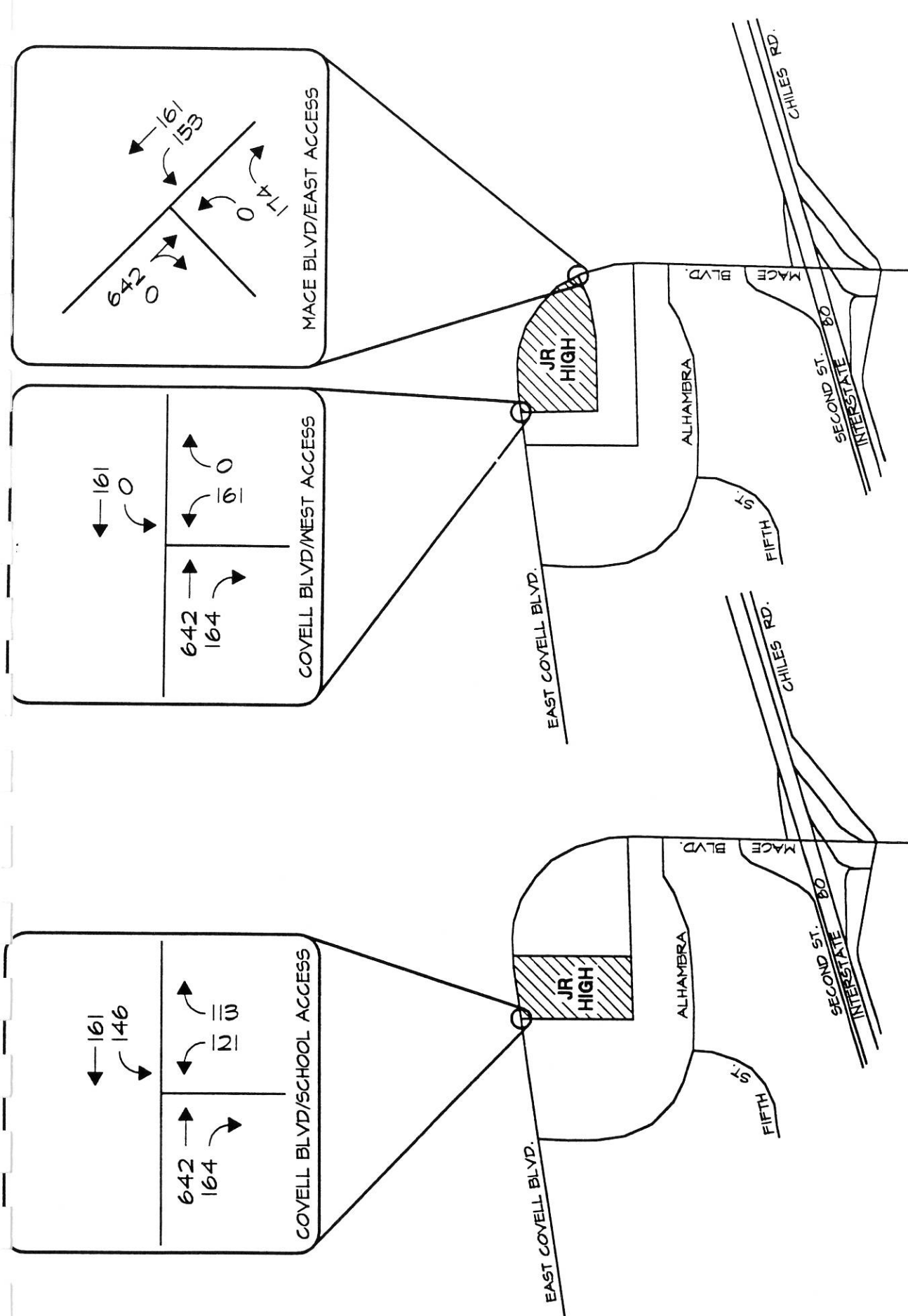
The Level of Service analysis indicates that each access will operate well during the a.m. peak hour. These calculations assume that Covell Blvd and/or Mace Blvd is not widened to a four lane section. It would be prudent, however, to widen each road to its ultimate width in the immediate vicinity of the intersection itself in order to avoid the need to relocate improvements when the road is eventually widened.

Preliminary Design Recommendations. The configuration of the school's access intersections should be consistent with the traffic characteristics of this use and the speed of traffic on Covell Blvd and/or Mace Blvd. Preliminary recommendations for the length of left turn pockets and right turn lanes have been developed based on Caltrans standards, as noted in the Appendix.

If conventional intersections are created at the project access, then signalization should be planned. As noted earlier, it is likely that if only one access is created, traffic signals will be needed when the school opens. If two access locations are created, it may be that signalization could be delayed, although a final decision on signalization is predicated on the level of background development and the actual configuration of the site. Provisions should be made for installing key underground elements (i.e., conduit across streets) as the access is created.



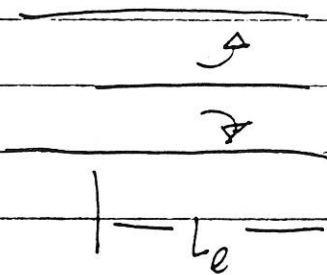
YEAR 2010 AM PEAK HOUR TRAFFIC WITH JR HIGH
(EXPANDED BICYCLE FACILITIES I.E. 0.46 TRIPS/STUDENT)



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YEAR 2010 AM PEAK HOUR TRAFFIC WITH JR HIGH
 (LIMITED BICYCLE FACILITIES I.E. 0.68 TRIPS/STUDENT)

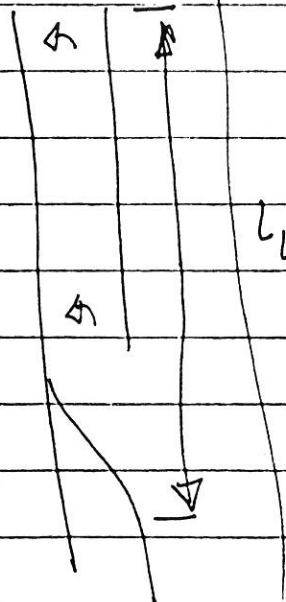
EXIST
ACCESS



MSPL



L_L



$$L_L = \text{decel} \quad (315')$$

+ STORAGE
(10)

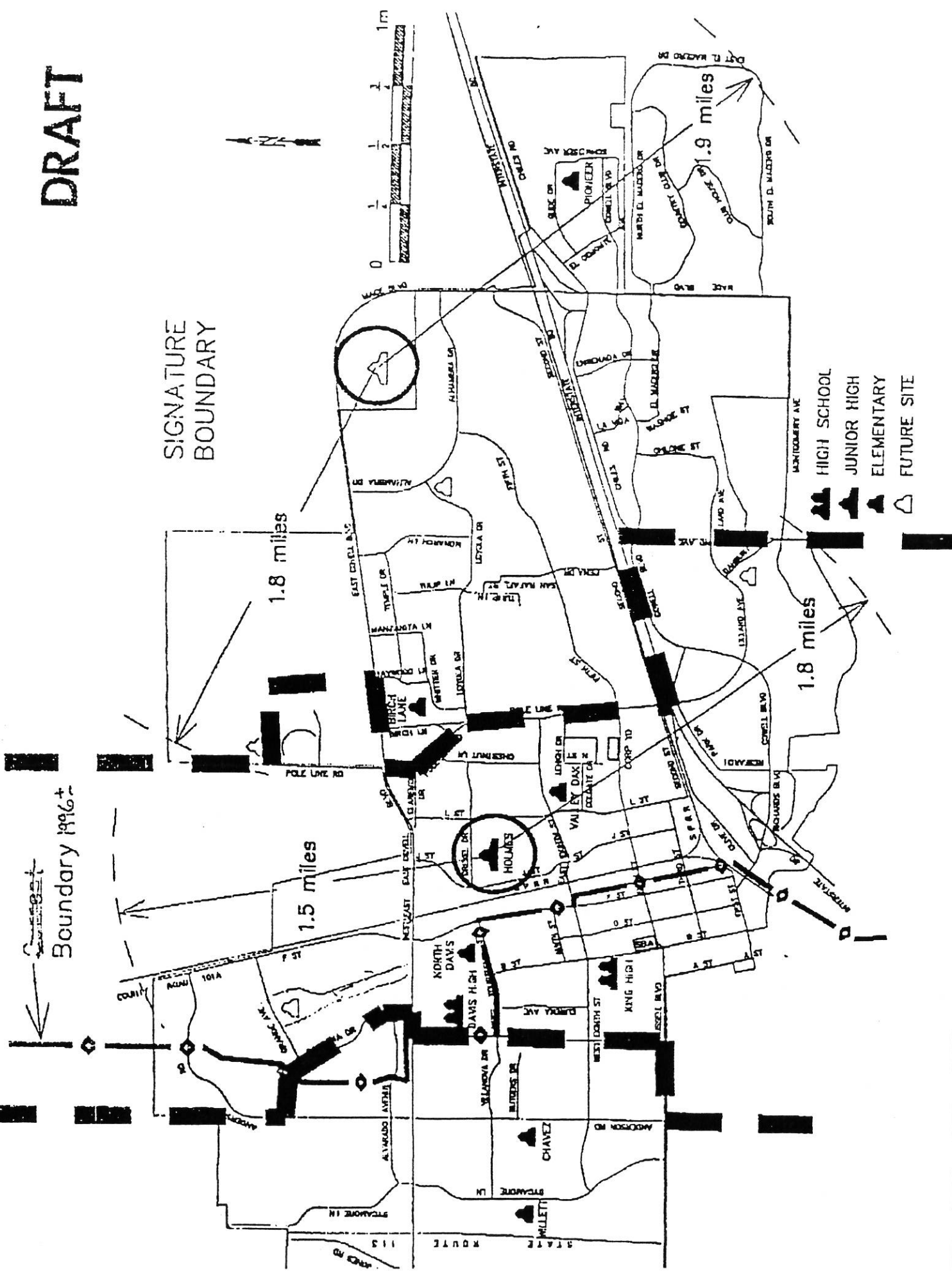
$$\underline{290}$$

$$505'$$

$$L_e = \text{say } L = 100'$$

DRAFT

SIGNATURE
BOUNDARY



- HIGH SCHOOL
- JUNIOR HIGH
- ELEMENTARY
- FUTURE SITE

Boundary 1996±

1.8 miles

1.5 miles

1.8 miles

1.9 miles

