TRAFFIC IMPACT STUDY

FOR THE

UNION MINE LANDFILL EXPANSION EIR

IN THE

COUNTY OF EL DORADO

April 18, 1991

Prepared by

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Introduction

TJKM Transportation Consultants was retained to conduct a traffic impact study for the proposed Union Mine Landfill Expansion located in El Dorado County. The landfill site is located in the area near the midpoint of Union Mine Road. Union Mine Road intersects State Road 49 at a point north and south of the landfill location. A traffic analysis was performed at six intersections determined by El Dorado County and Caltrans.

The study recommends mitigation measures to improve circulation and provide adequate capacity at critical locations and determines the project impacts to study intersections. The intent was to develop mitigation measures that would result in intersection operations at Level of Service (LOS) C or better at all study intersections (as defined by El Dorado County) during all study periods and provide adequate roadway structural sections for landfill truck traffic.

The landfill expansion area is located as shown in Figure 1. The expanded landfill would encompass approximately 15 acres located immediately south and adjacent to the existing landfill area.

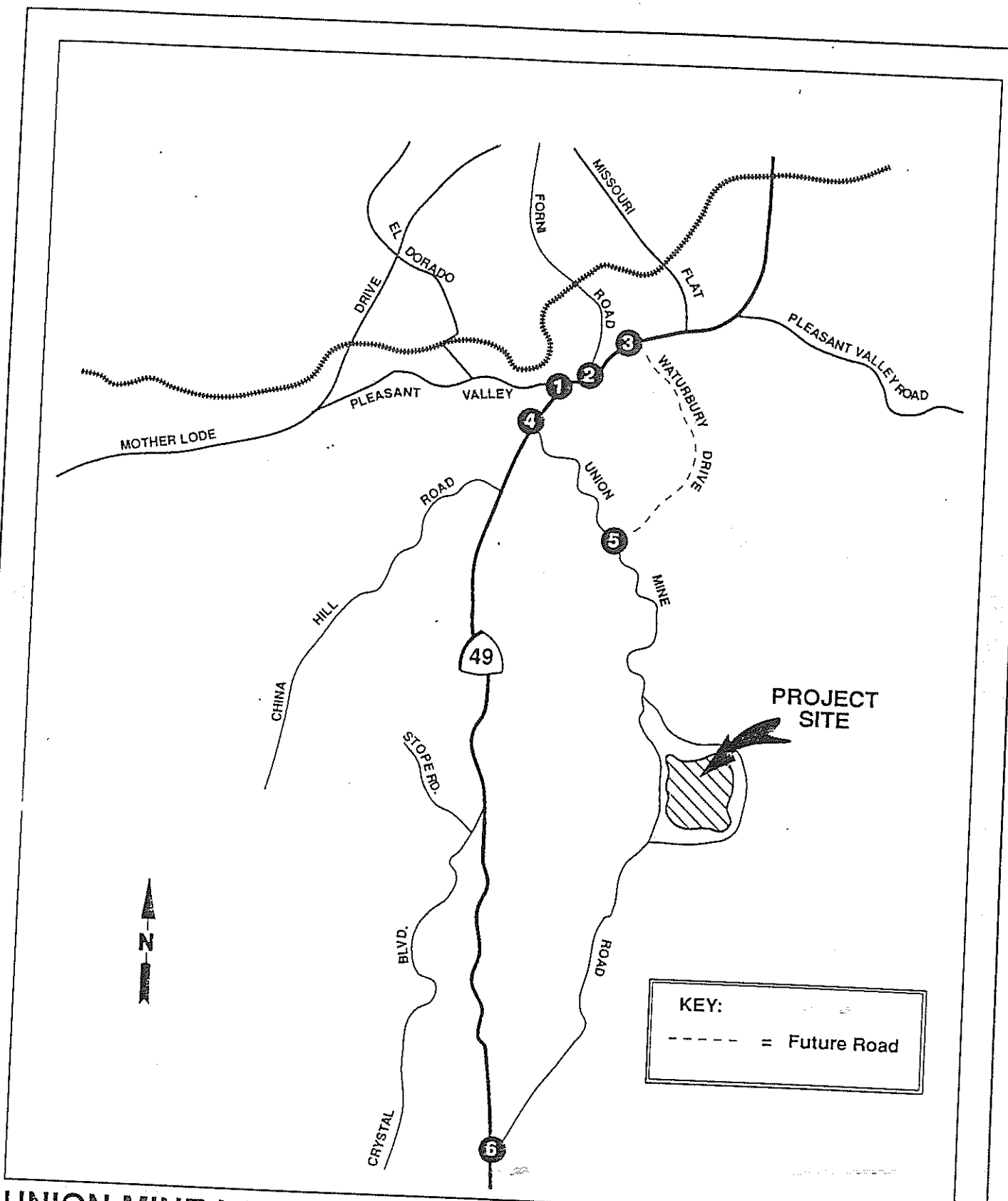
Six intersections and four traffic scenarios are analyzed. The combination of scenarios include:

- Existing Conditions
- Existing Plus Project Conditions
- Cumulative Conditions
- Cumulative Plus Project Conditions

Intersection and roadway section turning movement volumes and average daily traffic volumes were obtained by TJKM, Caltrans and El Dorado County. These volumes represent current existing traffic conditions.

Summary

The trip generation in this study was estimated from actual traffic counts near the Union Mine Landfill and days sales receipts from the landfill cash register receipts. The Union Mine Landfill is currently generating an average of 290 weekday daily trips. Of the 290 weekday trips, 13 would be inbound and 13 would be outbound



UNION MINE LANDFILL EXPANSION

FIGURE 1 PROJECT LOCATION AND STUDY INTERSECTIONS

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during the a.m. peak hour and 14 would be inbound and 14 would be outbound during the p.m. peak hour. Of the 290 weekday trips, 60 would be inbound trucks and 60 would be outbound trucks.

It was determined after review of the study area volumes and current traffic operations, the intersection of Pleasant Valley Road at SR49 (Intersection 1) would be the controlling intersection for the traffic operations in the Union Mine Landfill area.

The distribution of project traffic is based on existing travel patterns and consideration of population, household and employment locations in the year 2010. Distribution assumptions are listed below:

North	35%
South	0%
East	15%
West	50%

Cumulative trips were estimated using p.m. peak hour and average daily traffic volumes.

Potential mitigation for all traffic conditions analyzed has been identified with the intent to mitigate study intersections to Level of Service C or better. The types of mitigations needed to provide adequate circulation included signal installations, additional through and turning lanes and traffic indices (TI's) for future pavement structural requirements.

Under the "Existing Plus Projects" Scenario, project traffic volumes would be added to the existing conditions traffic. In this study, the project (Union Mine Landfill expansion) is currently operational and does not add additional traffic volume immediately after the capacity is increased. An increase in landfill traffic will occur as the area grows in population and garbage collection grows to meet the projected future population demand. Under this scenario routine roadway maintenance should provide TI values of 7.5 on Union Mine Road between the landfill and the north end of Union Mine Road, 8.5 on SR 49 between Union Mine Road and Forni Road and 7.5 on Forni Road near SR 49. (see Table I)

Under the "Cumulative" Scenario, the intersection of Pleasant Valley at SR 49 will need one exclusive right turn lane and one exclusive left turn lane for the northbound approach; two exclusive through lanes for the eastbound approach and two left turn lanes for the westbound approach. Under this scenario routine roadway maintenance should provide TI values of 8.0 on Union Mine Road between the landfill and the north end of Union Mine Road, 9.5 on SR 49 between

Union Mine Road and Forni Road and 8.5 on Forni Road near SR 49. (see Table II) NO TRUCK signs should be added to the future Waterbury Drive at the north and south road entrances to prevent truck traffic from using Waterbury Drive as a through street. Consideration should also be given to the installation of three-way STOP sign traffic control at the future intersection of Waterbury Drive and SR 49.

Under the "Cumulative Plus Project" Scenario, the mitigations are the same as those for the "Cumulative" Scenario.

Table I
Traffic Indices (TI's) for Union Mine Landfill Expansion
Existing Conditions

Road and Section	ADT/Lane	2 - Axle		3 - Axle		4 - Axle		5 - Axle		Totals		
		Trucks	ESAL*	Trucks	ESAL*	Trucks	ESAL*	Trucks	ESAL*	Trucks	ESAL*	TI
State Route 49												
China Hill to Union Mine	2,450	96	66	34	63	4	11	25	174	159	314	8.0
Union Mine to Pleasant Valley	3,400	133	92	47	87	5	15	35	242	221	436	8.0
Pleasant Valley to Missouri Flat	5,650	222	153	79	145	8	25	58	402	367	725	8.5
Union Mine Road												
Landfill Entrance North	550	38	26	76	139	2	5	--	--	116	171	7.5
Landfill Entrance South	55	10	7	--	--	--	1	--	--	10	--	5.0
Forni Road												
State Route 49 North	895	382	264	3	6	3	9	--	--	388	278	7.5

10-Year ESAL Factors (Caltrans)

2-Axle	690
3-Axle	1,840
4-Axle	2,940
5-Axle or more	6,890

*Equivalent Single-Axle Loadings (ESAL's) are x 1000

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Table II
Traffic Indices (TI's) for Union Mine Landfill Expansion
Cumulative Conditions

Road and Section	ADT/Lane	2 - Axle		3 - Axle		4 - Axle		5 - Axle		Totals		
		Trucks	ESAL*	Trucks	ESAL*	Trucks	ESAL*	Trucks	ESAL*	Trucks	ESAL*	TI
State Route 49												
China Hill to Union Mine	5,350	210	145	74	137	8	24	55	381	348	686	8.5
Union Mine to Pleasant Valley	7,450	292	202	104	191	11	33	77	531	484	956	8.0
Pleasant Valley to Missouri Flat	12,400	487	336	172	317	19	55	128	883	806	1,591	9.5
Union Mine Road												
Landfill Entrance North	1,200	83	57	165	304	4	12	--	--	252	373	8.0
Landfill Entrance South	120	21	15	--	--	1	2	--	--	22	17	5.5
Forni Road												
State Route 49 North	1,950	832	574	7	12	7	20	--	--	846	606	5.5

10-Year ESAL Factors (Caltrans)

2-Axle	690
3-Axle	1,840
4-Axle	2,940
5-Axle or more	6,890

*Equivalent Single-Axle Loadings (ESAL's) are x 1000

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EXISTING ROADWAYS AND INTERSECTIONS

EXISTING ROADWAYS AND INTERSECTIONS

The following is a description of study area roadways. P.M. peak hour turning movement counts were taken by TJKM technical staff during the week of March 7, 1988. Other traffic counts and truck classifications were obtained from El Dorado County, Patterson Development and Caltrans. Figure 2 shows existing peak hour turning movement and average daily traffic volumes for study area roadways and intersections.

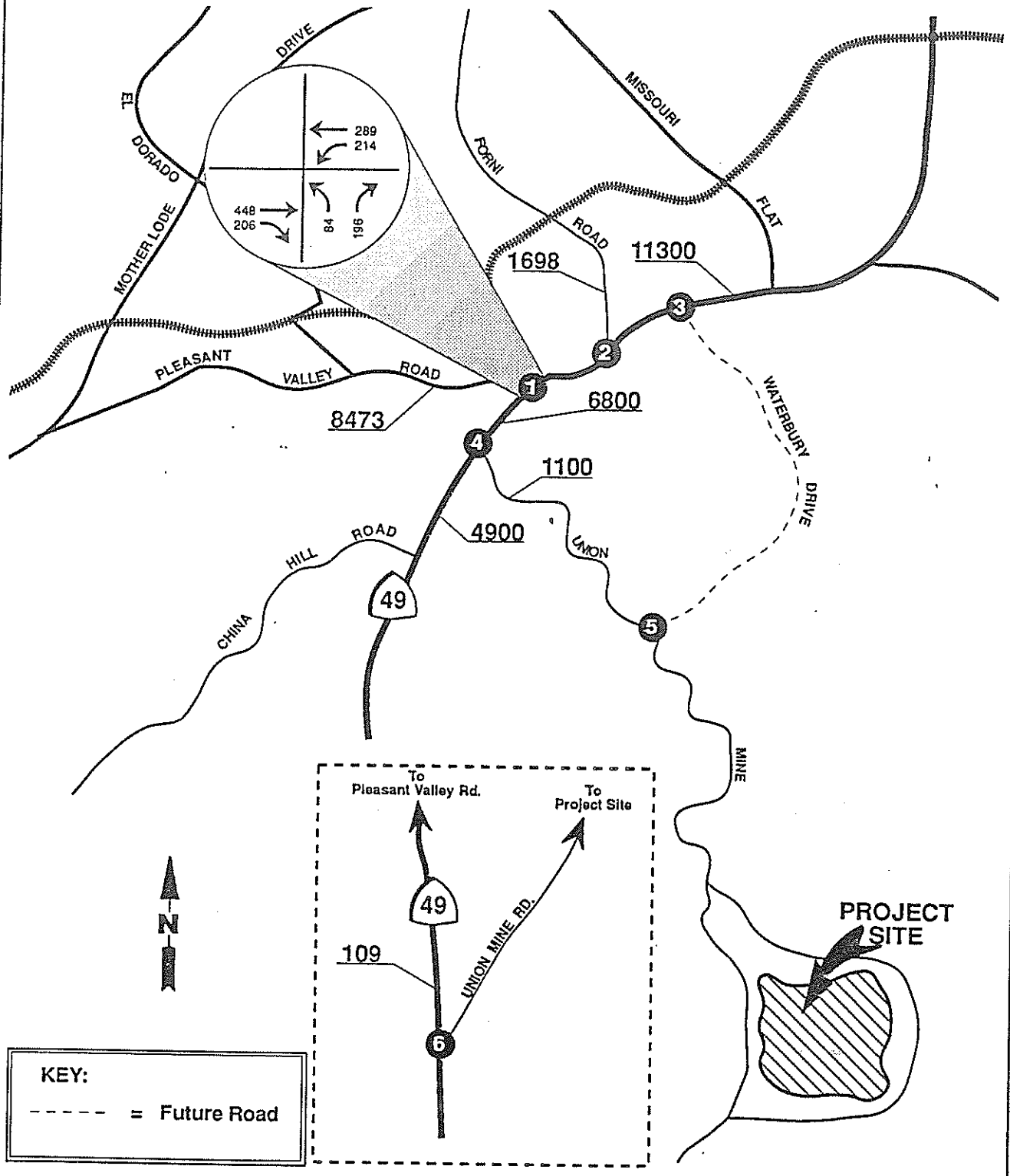
State Route 49

SR 49 is a two-lane north-south undivided highway facility. Based on Caltrans 1989 traffic volumes, SR 49 carries from 4,900 to 11,380 vehicles daily for west of Missouri Flat Road to south of China Hill Road.

The intersection of SR 49 at Forni Road is STOP-sign controlled and has one shared lane which includes left-turn and right-turn movements on the Forni Road approach. The intersection has one shared lane for the eastbound SR 49 approach which includes through and left-turn movements. The intersection has one shared lane for the westbound SR 49 approach which includes through and right-turn movements.

The intersection of Pleasant Valley Road at SR 49 is STOP-sign controlled for all traffic approaches and has one exclusive left-turn lane and one exclusive through lane on the westbound SR 49 approach; one shared right-turn and left-turn lane for the northbound SR 49 approach; and one shared right-turn and through lane for the Pleasant Valley Road approach.

The intersection of SR 49 at Union Mine Road is STOP-sign controlled for the westbound approach and has one shared left-turn and right-turn lane for the westbound approach; one shared right-turn and through lane for the northbound approach; and one shared left-turn and through lane for the southbound approach.



UNION MINE LANDFILL EXPANSION

FIGURE 2 EXISTING AVERAGE DAILY TRAFFIC AND P.M. PEAK HOUR VOLUMES

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Union Mine Road

Union Mine Road is presently a two-lane roadway running north and south parallel to SR 49. The average daily traffic volumes range from 1,100 vehicles per day at its northern most intersection with SR 49 to 109 vehicles per day at its south intersection with SR 49.

Pleasant Valley Road

Pleasant Valley Road is a two-lane major collector which parallels SR 50 south of Placerville. Based on El Dorado County 1990 traffic counts, Pleasant Valley Road carries 8,473 vehicles daily between El Dorado Road and SR 49.

Forni Road

Forni Road is a two-lane local roadway. Based on El Dorado County 1991 traffic counts Forni Road carries 1,698 vehicles daily near the intersection of Forni Road and SR 49.

EXISTING TRAFFIC CONDITIONS

Six intersections were identified by the El Dorado County and Caltrans staff as key study intersections that would be most affected by the development of the project. Figure 1 shows the location of the study intersections, the assigned intersection numbers and the proposed site location.

Intersection capacity analyses were performed to determine the existing traffic conditions during the typical weekday p.m. peak hours. This was accomplished by calculating the volume-to-capacity ratio and Level of Service rating. The method used, known as the critical movement method, involves consideration of "critical" (or high volume) conflicting movements and is based on information from a number of sources including *Interim Materials on Highway Capacity*, Transportation Research Circular No. 212, Transportation Research Board, 1980. /1/ A description of the method used to analyze the capacity at the intersections is contained in Appendix A.

The volume-to-capacity ratio is an indication of the level of service. The level of service classification system is a scale which ranks street and highway operations based on the amount of traffic and the traffic conditions. This scale or ranking system is generally accepted by transportation and traffic engineers. A complete description of the system is included in the *Highway Capacity Manual* (Special Reports 87 and 189), Highway Research Board, 1965 and 1985. /2,3/

Briefly, the level of service ranking system is a scale with a range of A through F. Level of Service A represents free flow conditions and Level of Service F represents jammed conditions. The relationship of the volume-to-capacity ratio to level of service is given in the table found in Appendix A.

It was determined after review of the study area volumes and current traffic operations, the intersection of Pleasant Valley Road at SR 49 (intersection #1) would be the controlling intersection for the traffic operations in the Union Mine Landfill area. The results of the intersection capacity analysis for existing weekday conditions are presented in Table III. The intersection capacity analyses calculation sheets for existing conditions are contained in Appendix B. The controlling study intersection is currently operating at LOS D, indicating the approach of unstable traffic flows with tolerable delay. Although the calculation of this intersections capacity yields LOS D, the actual on street operation is perceived to be better than LOS D because the eastbound to southbound right

Table III
P.M. Peak Hour Volume-to-Capacity Ratios and Levels of Service at the Intersection of Pleasant Valley Road and State Route 49

Conditions	V/C	LOS
Existing*	0.85	D
Existing Plus Project	0.85	D
Cumulative	1.68	F
Cumulative Plus Project	1.68	F
Existing Mitigated	0.70	B
Cumulative Mitigated	0.72	C

*Actual on-street operation is better than LOS D due to right turn lanes operating as if they were exclusive instead of shared for the distance of two to three car lengths.

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turns are operating as if they were made from an exclusive right turn lane for the distance of two to three car lengths. Also, the northbound to eastbound right turns are operating in the same manner.

Traffic Signal Warrant Analyses

As noted in the Caltrans *Traffic Manual*, traffic signals are designed to provide orderly assignment of right-of-way to various traffic movements at an intersection. /4/ When justified and properly designed, traffic signals should reduce the frequency of certain types of accidents (primarily right-angle) and provide orderly movement. Unjustified, ill-designed, improperly-operated, or poorly maintained signals may cause increased accident frequency, excessive delay, disregard for signal indications, and circuitous travel by alternate routes.

Caltrans has developed warrants or guidelines for analyzing the need for traffic signals. These warrants include consideration of minimum traffic volumes, interruption of continuous traffic on the main street for side street traffic, minimum pedestrian volumes, school crossings, progressive movement of traffic along a route, accident experience, the overall street system with existing or proposed signals, and a combination of these factors. These warrants include consideration of daily traffic volumes eight-hour volumes, four-hour volumes, and peak hour volumes.

The weekday volumes of the study intersections were analyzed to determine if traffic signals would be warranted under existing conditions and all other conditions. The need for a traffic signal was determined using the peak hour volume warrants found in the Caltrans *Traffic Manual*. /4/

Signal warrant calculations for the controlling intersection under all conditions are presented in Table IV. The minimum volume warrant under existing weekday traffic conditions was met at the Pleasant Valley Road at SR 49 intersection.

Pavement Conditions

Existing pavement conditions were evaluated using traffic index (TI) measurements. The TI determines the required structural thickness for asphalt concrete pavement, and is a measure of the total weight expected through tires on the roadway surface during the design lifetime of the pavement. Due to the larger weight of trucks, the effects of passenger cars, pick-up trucks, vans and two-axle trucks with single rear tires are considered negligible.

Table IV
Traffic Signal Analysis at
Pleasant Valley Road and State Route 49

Type	Signal Warranted
Existing	Y
Existing Plus Project	Y
Cumulative	Y
Cumulative Plus Project	Y

N = does not meet signal warrants
Y = meets the peak hour signal warrants
B = marginally meets peak hour signal warrants

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Trucks are classified according to their number of axles, with trucks having six or more axles being classified as five-axle trucks. The percentage distribution of truck traffic by axle type was estimated from daily traffic counts conducted by El Dorado County during March 1991. These counts were broken down by axle type for a 24-hour period. Truck traffic along Union Mine Road was estimated as 33 percent 2-axle trucks, 65 percent 3-axle trucks, 2 percent 4-axle trucks and 0 percent 5-or-more-axle trucks. The truck traffic volume mix is converted to 18,000 pound equivalent single-axle loads (ESAL's) for the design period. The sum of ESAL's is converted to a TI which is used to select or design the asphalt concrete pavement section.

Existing design TI ratings for all critical road segments within the study area have been identified in Table I.

PROJECT DESCRIPTION

PROJECT DESCRIPTION

The proposed project is located in El Dorado County. The project site is located at the midpoint on the east side of Union Mine Road, as shown in Figure 1. The proposed plan is to develop this site with an additional 15 acres of disposal area.

Trip Generation

The landfill trips used in this study are from traffic counts taken near the Union Mine Landfill entrance. The total number of peak hour vehicle trips generated by the project are split into inbound and outbound traffic for the weekday and a.m. and p.m. peak period. The peak hour percentages for directional splits are assumed with one entering landfill trip end yielding one exiting trip generated.

The number of trips in the cumulative projection scenario were generated by using a four percent per year growth rate recommended by Caltrans. Intersection turning movements for the Pleasant Valley at SR 49 intersection were obtained from TJKM technical staff.

The trip generation in this study was estimated from actual traffic counts near the Union Mine Landfill and days sales receipts from the landfill cash register receipts. The Union Mine Landfill is currently generating and average of 290 weekday daily trips. Of the 290 weekday trips, 13 would be inbound and 13 would be outbound during the a.m. peak hour and 14 would be inbound and 14 would be outbound during the p.m. peak hour. The 290 weekday trips consists of 60 inbound truck and 60 outbound truck trips.

Trip Distribution

The distribution of project traffic is based on existing travel patterns and consideration of population, household and employment locations. Distribution assumptions are as follows:

North	35%
South	0%
East	15%
West	50%

This distribution pattern was developed by TJKM and approved by El Dorado County staff.

TRAFFIC IMPACTS

TRAFFIC IMPACTS

Traffic impacts of three scenarios were analyzed. The first is an "Existing Plus Project" conditions, which adds approved project traffic to existing traffic to determine the impacts pending immediate construction of the recent approved project.

The second scenario is the "Cumulative" condition. The cumulative condition illustrates what the expected traffic conditions without the proposed project would be in the year 2010.

The third scenario is the "Cumulative Plus Project" condition. For this condition project traffic is added to the cumulative traffic to determine the impacts of the project in 20 years.

"Existing Plus Project" Scenario

The project traffic in this study is essentially already a part of the existing traffic although, one landfill expansion alternative for leachate disposal will add four truck trips a day to the existing traffic volumes. These additional truck trips are considered an insignificant increase for this study. The weekday volume-to-capacity ratios and levels of service for the p.m. peak hour are the same as the "Existing" scenario and are summarized in Table III. Detailed intersection capacity calculation sheets for this scenario are found in Appendix C. "Existing Plus Project" p.m. peak hour traffic volumes and average daily traffic volumes are shown in Figure 2.

Under the "Existing Plus Project" conditions, the intersection of Pleasant Valley Road and SR 49 would be operating at Level of Service D, indicating the approach of unstable traffic flows with tolerable delay. Although the calculation of this intersections capacity yields LOS D, the actual on street operation is perceived to be better than LOS D because the eastbound to southbound right turns are able to operate as an exclusive right turn lane for a distance of two to three car lengths. Also, the northbound to eastbound right turns are able to operate in the same manner.

"Cumulative" Scenario

The number of trips in the cumulative projection scenario were generated by using a four percent per year growth rate recommended by Caltrans. The weekday volume-to-capacity ratios and levels of service for the p.m. peak hour is

summarized in Table III. Detailed capacity calculation sheets for this scenario are found in Appendix D. "Cumulative" p.m. peak hour traffic volumes and average daily traffic volumes are shown in Figure 3.

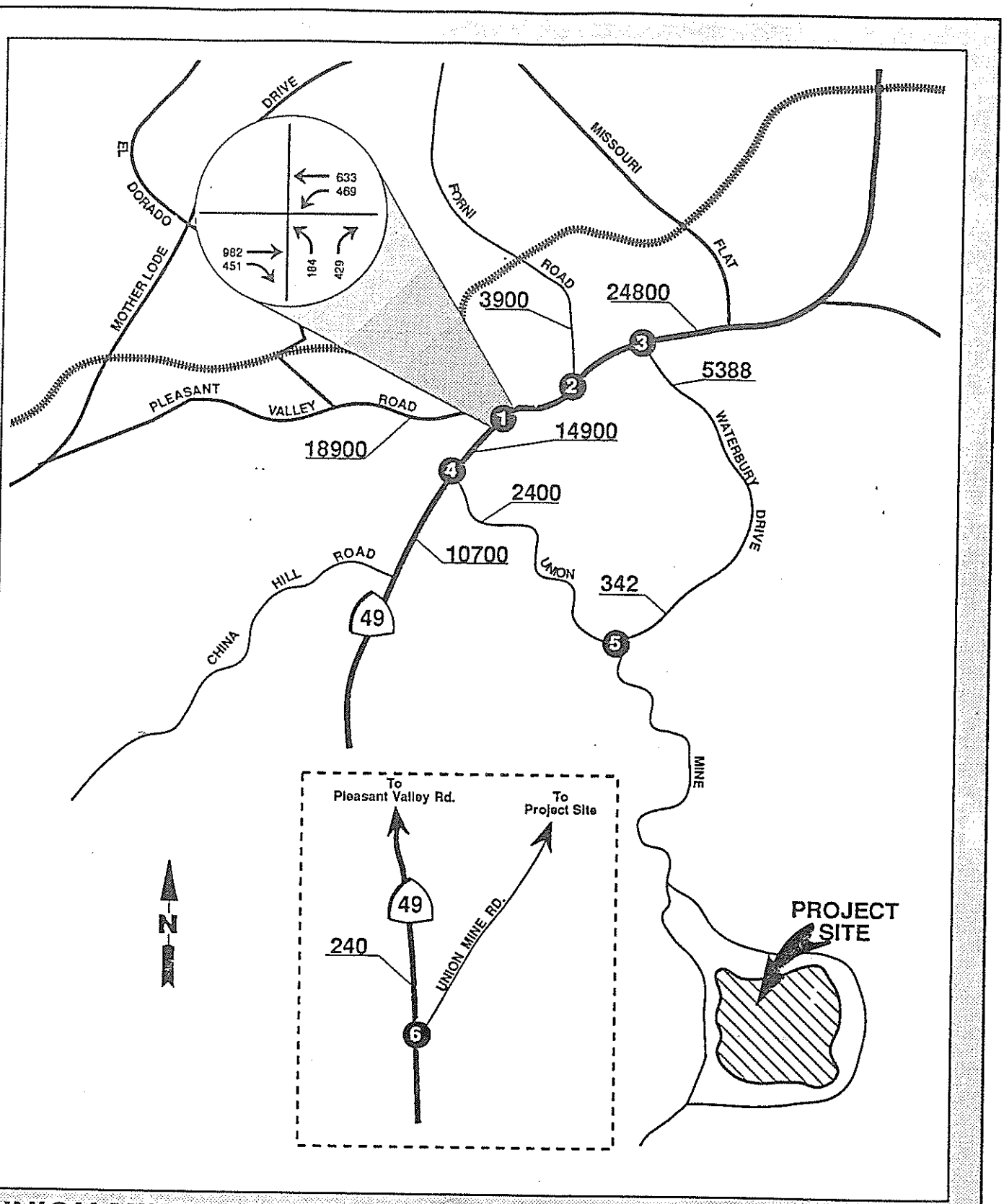
Under the "Cumulative" condition without the construction of the proposed project, the intersection of Pleasant Valley Road and SR 49 would be operating at Level of Service D which indicates traffic is approaching unstable flow with tolerable delay. However, with the mitigation proposed under these conditions, the intersection of Pleasant Valley Road at SR 49 would be operating at Level of Service C.

Under the "Cumulative" condition, SR 49 and Pleasant Valley Road will exceed Level Of Service C for a two-lane road and should be widened to accommodate four traffic lanes.

Under this scenario routine roadway maintenance should provide TI values of 8.0 on Union Mine Road between the landfill and the north end of Union Mine Road, 9.5 on SR 49 between Union Mine Road and Forni Road and 8.5 on Forni Road near SR 49 see Table II. NO TRUCK signs should be added to the future Waterbury Drive at the north and south road entrances to prevent truck traffic from using Waterbury Drive as a through street. Waterbury Drive is a future road planned for installation with the later development of east El Dorado. This roadway could provide a cut-through route for landfill truck traffic if traffic signs prohibiting its use are not installed.

"Cumulative Plus Project" Scenario

Since the Union Mine Landfill project is currently operating and weekday traffic generated by the project will increase at the same growth rate as the cumulative traffic scenario the cumulative plus project traffic projection will yield the same volumes as those projected in the cumulative traffic scenario.



UNION MINE LANDFILL EXPANSION

FIGURE 3 CUMULATIVE AVERAGE DAILY TRAFFIC AND P.M. PEAK HOUR VOLUMES

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MITIGATION

MITIGATION

Mitigation measures were designed to eliminate the potential congestion at the study intersections. The intent was to develop mitigation measures which would result in intersection operations of Level of Service C or better at all study intersections.

The resulting volume-to-capacity ratios and levels of service for the mitigated "Existing" and "Cumulative" scenarios are shown in Table III.

"Existing" Scenario

Intersection 1: Pleasant Valley Road at SR 49

-- Provide one exclusive right-turn lane for the eastbound approach.

-- Install traffic signal.

"Existing Plus Project" Scenario

Intersection 1: Pleasant Valley Road at SR 49

-- Provide roadway structural base strength with TI's found in Table II when routine roadway maintenance is provided.

"Cumulative" Scenario

Intersection 1: Pleasant Valley Road at SR 49

-- Provide one exclusive left-turn lane and one exclusive right turn lane for the northbound approach, two exclusive left-turn lanes and one exclusive through lane for the westbound approach and two exclusive through lanes and one exclusive right turn lane for the eastbound approach.

Intersection 3: Waterbury Drive at SR49

-- Consider installation of three-way STOP sign traffic control when intersection is built.

Between Intersection 3 & 6: on Waterbury Drive

-- Provide NO TRUCK signs along Waterbury Drive to prevent trucks from using Waterbury Drive to access the Union Mine Landfill.

-- Provide TI's in Table II when routine roadway maintenance is provided.

SR49 and Pleasant Valley Road

-- Provide a four lane roadway section to accommodate cumulative traffic volumes.

"Cumulative Plus Project" Scenario

-- No additional mitigation required.

REFERENCES

REFERENCES

1. *Interim Materials on Highway Capacity,* Transportation Research Circular No. 212, Transportation Research Board, 1980.

2. *Highway Capacity Manual (Special Reports 87 and 189),* Highway Research board, 1965 and 1985.

3. *Highway Capacity Manual (Special Reports 87 and 189),* Highway Research board, 1965 and 1985.

4. *Traffic Manual,* Caltrans

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STUDY PARTICIPANTS

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APPENDICES

APPENDIX A

Description Of
Intersection Capacity Analysis

DESCRIPTION OF INTERSECTION CAPACITY ANALYSIS

TJKM utilizes a method of intersection capacity analysis known as the Intersection Capacity Utilization (ICU) method. A variation (and derivation) of the TJKM method, known as the critical movement analysis, is described in "Interim Materials on Highway Capacity", *Transportation Research Circular 212*, January 1980, published by the Transportation Research Board of the National Academy of Sciences. The TJKM method is similar to the Planning Applications method of Signalized Intersection Analysis described in Circular 212.

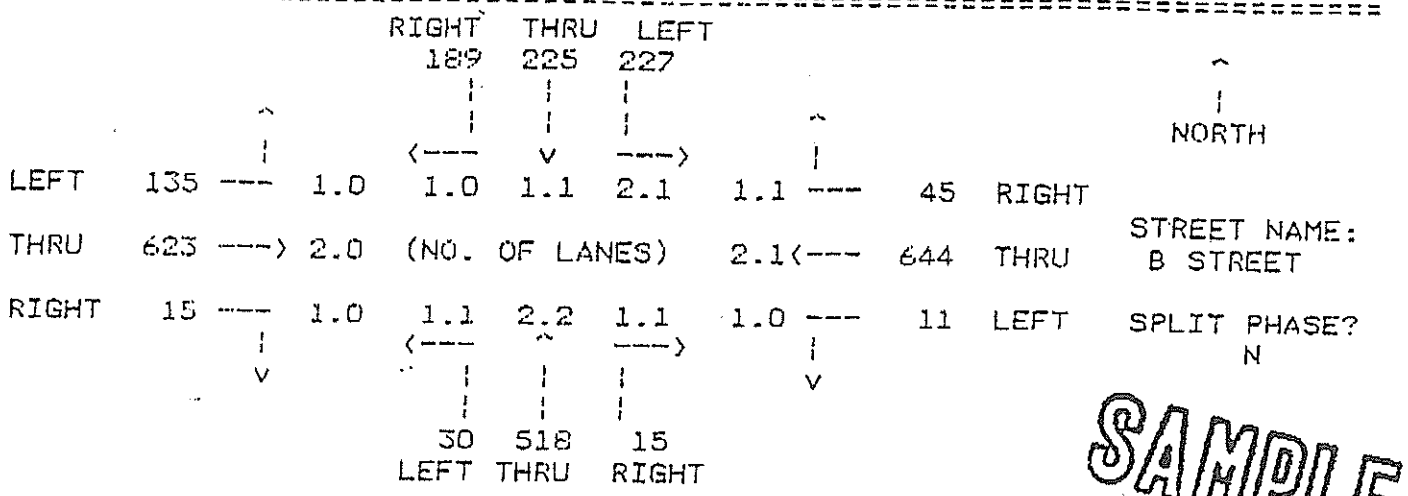
The method sums the volume-to-capacity (V/C) ratio of each governing (or critical) signal phase at an intersection to produce an overall intersection volume-to-capacity ratio. When the ratio of volume to capacity reaches unity (1.00), the intersection is "at capacity" and is described as operating at Level of Service E and approaching Level of Service F conditions. See the table "Summary of Levels of Service for Intersections" for the relationship between the level of service rating and volume-to-capacity ratio.

A sample calculation is shown on the accompanying computer print-out "TJKM Intersection Capacity Analysis." This example describes a hypothetical intersection of A Street and B Street, which is regulated by three phase traffic signals. The first phase is for southbound traffic only and contains three lanes. Right-turn movements in the right lane (189 vehicles) have a smaller per lane volume than in the two remaining lanes (226 vehicles). Therefore, the length of the signal phase is governed by the traffic in the two left lanes. The capacity of Phase 1 is 2,700 vehicles per hour of green, the volume is 452 vehicles and the resulting volume-to-capacity ratio is 0.1674. Phase 2, for the northbound movements, has two lanes and a volume-to-capacity ratio of 0.1877. For Phase 3, the westbound through plus right traffic cannot proceed through the intersection at the same time as the eastbound left-turn movement, even though they are on the same signal phase. Practically, the left turning vehicles and opposing through traffic alternate as gaps in traffic allow. The total Phase 3 capacity requirement is the sum of the westbound through and right combined, 0.2187, and the eastbound left, 0.0900. The critical movement V/C ratios are summed, then rounded to two decimal places. An allowance for yellow time (assumed to be lost time for vehicle movement) is added to obtain the overall intersection volume-to-capacity rating. In the example, the intersection rating of 0.76 equates to a Level of Service C designation.

The advantages of this type of capacity calculation is its direct relationship to actual intersection operations and the ease with which changes in volume or capacity (or both) can be analyzed. In addition, the level of accuracy of this method is comparable to that of the traffic projection process used to determine future traffic volumes.

TJKM INTERSECTION CAPACITY ANALYSIS 2/5/86

INTERSECTION 1 A STREET and B STREET SAMPLE
COUNT DATE/TIME: 1/1/00 4:00-6:00 PM PEAK HOUR: 4:30-5:30 PM
CONDITION : P.M. PEAK HOUR - EXISTING FILE SAMPLE



SAMPLE

STREET NAME: A STREET SPLIT PHASE? Y

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	15	15	1500	0.0100	
	THRU (T)	518	518	3000	0.1727	
	LEFT (L)	30	30	1500	0.0200	
	T + R		533	3000	0.1777	
	T + L		548	3000	0.1827	
	T + R + L		563	3000	0.1877	0.1877
SB	RIGHT (R)	189	42 *	1500	0.0280	
	THRU (T)	225	225	1500	0.1500	
	LEFT (L)	227	227	2700	0.0841	
	T + L		452	2700	0.1674	0.1674
EB	RIGHT (R)	15	0 *	1500	0.0000	
	THRU (T)	623	623	3300	0.1888	
	LEFT (L)	135	135	1500	0.0900	0.0900
WB	RIGHT (R)	45	45	1500	0.0300	
	THRU (T)	644	644	3150	0.2044	
	LEFT (L)	11	11	1500	0.0073	
	T + R		689	3150	0.2187	0.2187

VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 0.66
ADJUSTMENT FOR LOST YELLOW TIME: 0.10

TOTAL VOLUME-TO-CAPACITY RATIO: 0.76
INTERSECTION LEVEL OF SERVICE: C

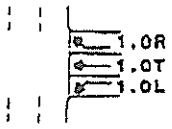
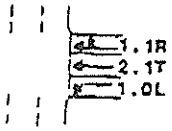
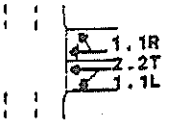
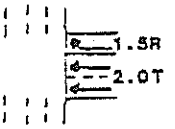
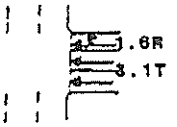
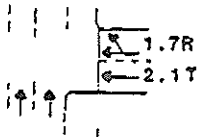
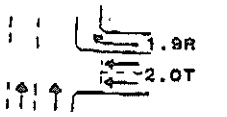
* ADJUSTED FOR RIGHT TURN ON RED

The number of lanes and the use of the lanes is denoted with a special nomenclature described below:

Lane Nomenclature

X.Y Where X Denotes the number of lanes available for a particular movement,

Y Denotes how the lanes are used.

When Y is ...	... The Following Applies:
0 	A lane used exclusively for a particular movement (i.e. exclusive left-turn lane),
1 	A lane which is shared, that is, either of two different movements can be made from a particular lane (i.e. a lane which is shared by through and right-turn traffic),
2 	Denotes two or more through lanes in which two lanes are shared, one with left-turn traffic, the other with right-turn traffic,
3	Denotes an expressway through movement,
5 	Denotes a right-turn movement from an exclusive right-turn lane with a right-turn arrow and U-turn prohibition on the conflicting left-turn movement,
6 	Denotes a right-turn movement from a shared lane with a right-turn arrow and U-turn prohibition on the conflicting left-turn movement,
7,8,9	Denote a turning movement which has an additional lane to turn into, as shown below:
7 	Turn lane which is shared and under signal control, and which has its own lane to turn into,
8 	Exclusive turn lane which is under signal control, and which has its own lane to turn into,
9 	Exclusive turn lane not under signal control, often referred to as a "free" turn. Since the volumes in this lane do not conflict with other intersection movements, the V/C ratio of the free right-turn movement is not included in the sum of critical V/C ratios.

LEVEL OF SERVICE FOR URBAN AND SUBURBAN ARTERIAL STREETS

LEVEL OF SERVICE	DESCRIPTION	VOLUME TO CAPACITY RATIO*
A	Free flow. Very slight or no delay. If signalized, conditions are such that no approach phase is fully utilized by traffic an no vehicle waits longer than one red indication. Turning movements are easily made, and nearly all drivers find freedom of operation.	0.00-0.60
B	Stable flow. Slight delay. If signalized, an occasional approach phase is fully utilized. Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles. This level is suitable operation for rural design purposes.	0.61-0.70
C	Stable flow. Acceptable delay. If signalized a few drivers arriving at the end of a queue may occasionally have to wait through one signal cycle. Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	0.71-0.80
D	Approaching unstable flow. Tolerable delay. Delays may be substantial during short periods, but excessive back-ups do not occur. Maneuverability is severely limited during short periods due to temporary back-ups.	0.81-0.90
E	Unstable flow. Intollerable delay. Delay may be great, up to several signal cycles. There are typically long queues of vehicles waiting upstream of the intersection.	0.91-1.00
F	Forced flow. Excessive delay. Intersection operates below capacity. Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	Varies*

References: *Highway Capacity Manual*, Special Report No. 209, Transportation Research Board, 1985.
Highway Capacity Manual, Special Report No. 87, Highway Research Board, 1965.
TJKM.

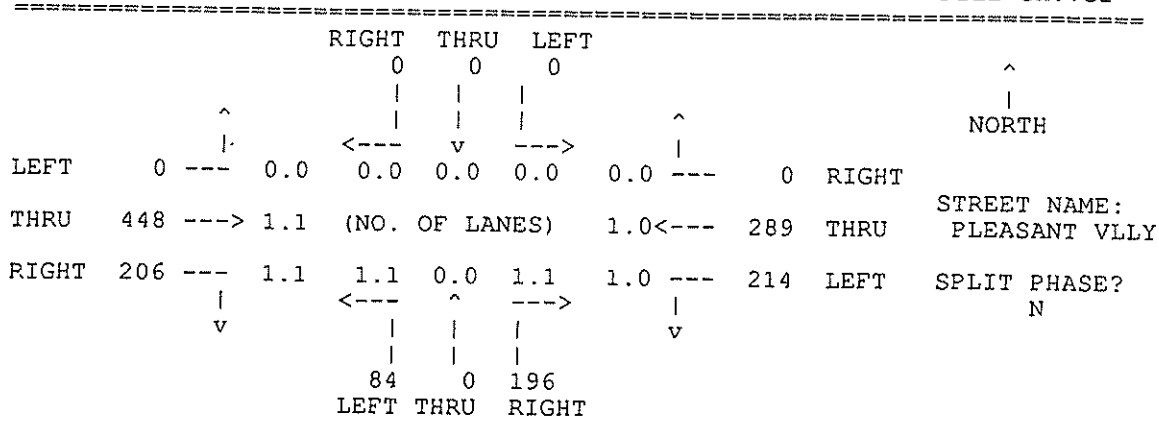
* In general, volume-to-capacity (V/C) ratios cannot be greater than 1.00, unless the lane capacity assumptions are too low. Also, if future demand projections are considered for analytical purposes, a ratio greater than 1.00 might be obtained, indicating that the projected demand would exceed the capacity.

APPENDIX B

Results of "Existing"
Intersection Capacity Analysis

TJKM INTERSECTION CAPACITY ANALYSIS 3/7/91

INTERSECTION 1 SR 49 and PLEASANT VLLY El Dorado County
COUNT DATE/TIME: PEAK HOUR:
CONDITION : EXISTING CONDITIONS FILE ex.vci



STREET NAME: SR 49 SPLIT PHASE? N

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB RIGHT (R)	196	196	1500	0.1307	
LEFT (L)	84	84	1500	0.0560	
T + R + L		280	1500	0.1867	0.1867
EB RIGHT (R)	206	206	1500	0.1373	
THRU (T)	448	448	1500	0.2987	
T + R		654	1500	0.4360	0.4360
WB THRU (T)	289	289	1650	0.1752	
LEFT (L)	214	214	1500	0.1427	0.1427

VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 0.77
ADJUSTMENT FOR LOST YELLOW TIME: 0.08

TOTAL VOLUME-TO-CAPACITY RATIO: 0.85
INTERSECTION LEVEL OF SERVICE: D

* ADJUSTED FOR RIGHT TURN ON RED

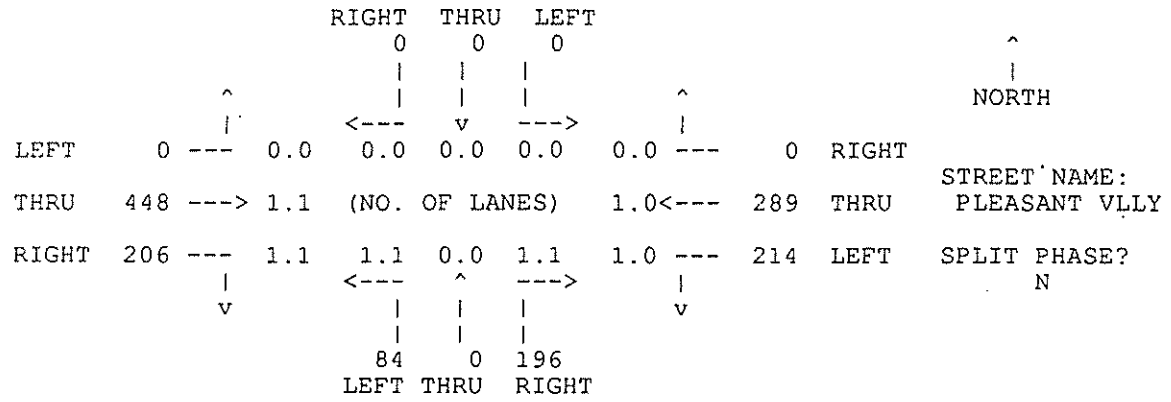
Developed by TJKM Transportation Consultants, Pleasanton, CA, 1989 YY

APPENDIX C

Results of "Existing Plus Project"
Intersection Capacity Analysis

TJKM INTERSECTION CAPACITY ANALYSIS 4/8/91

INTERSECTION 1 SR 49 and PLEASANT VLLY El Dorado County
COUNT DATE/TIME: PEAK HOUR:
CONDITION : EXISTING + PROJECT FILE ex.vci



STREET NAME: SR 49 SPLIT PHASE? N

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	196	196	1500	0.1307	
	LEFT (L)	84	84	1500	0.0560	
	T + R + L		280	1500	0.1867	0.1867
EB	RIGHT (R)	206	206	1500	0.1373	
	THRU (T)	448	448	1500	0.2987	
	T + R		654	1500	0.4360	0.4360
WB	THRU (T)	289	289	1650	0.1752	
	LEFT (L)	214	214	1500	0.1427	0.1427

VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 0.77
ADJUSTMENT FOR LOST YELLOW TIME: 0.08

TOTAL VOLUME-TO-CAPACITY RATIO: 0.85
INTERSECTION LEVEL OF SERVICE: D

* ADJUSTED FOR RIGHT TURN ON RED

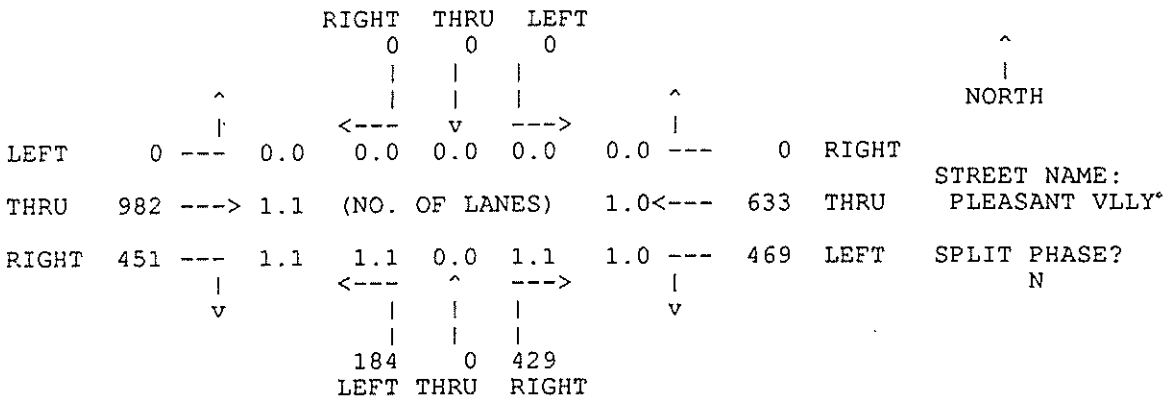
Developed by TJKM Transportation Consultants, Pleasanton, CA, 1989 YY

APPENDIX D

Results of "Cumulative"
Intersection Capacity Analysis

TJKM INTERSECTION CAPACITY ANALYSIS 4/2/91

INTERSECTION 1 SR 49 and PLEASANT VLLY El Dorado County
COUNT DATE/TIME: PEAK HOUR:
CONDITION : CUMULATIVE CONDITIONS FILE ex.vci



STREET NAME: SR 49 SPLIT PHASE? N

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB RIGHT (R)	429	429	1500	0.2860	
LEFT (L)	184	184	1500	0.1227	
T + R + L		613	1500	0.4087	0.4087
EB RIGHT (R)	451	451	1500	0.3007	
THRU (T)	982	982	1500	0.6547	
T + R		1433	1500	0.9553 **	0.9553
WB THRU (T)	633	633	1650	0.3836	
LEFT (L)	469	469	1500	0.3127	0.3127

VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 1.68
ADJUSTMENT FOR LOST YELLOW TIME: 0.00

TOTAL VOLUME-TO-CAPACITY RATIO: 1.68
INTERSECTION LEVEL OF SERVICE: F

* ADJUSTED FOR RIGHT TURN ON RED ** APPROACHING OR EXCEEDING CAPACITY

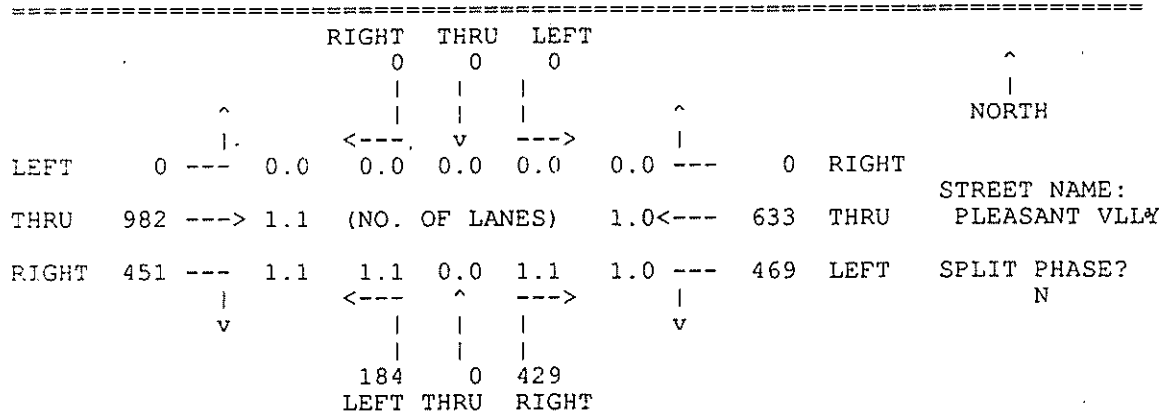
Developed by TJKM Transportation Consultants, Pleasanton, CA, 1989 YY

APPENDIX E

Results of "Cumulative Plus Project"
Intersection Capacity Analysis

TJKM INTERSECTION CAPACITY ANALYSIS 4/8/91

INTERSECTION 1 SR 49 and PLEASANT VLLY El Dorado County
COUNT DATE/TIME: PEAK HOUR:
CONDITION : CUMULATIVE PLUS PROJECT FILE ex.vci



STREET NAME: SR 49 SPLIT PHASE? N

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB RIGHT (R)	429	429	1500	0.2860	
LEFT (L)	184	184	1500	0.1227	
T + R + L		613	1500	0.4087	0.4087
EB RIGHT (R)	451	451	1500	0.3007	
THRU (T)	982	982	1500	0.6547	
T + R		1433	1500	0.9553 **	0.9553
WB THRU (T)	633	633	1650	0.3836	
LEFT (L)	469	469	1500	0.3127	0.3127

VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 1.68
ADJUSTMENT FOR LOST YELLOW TIME: 0.00

TOTAL VOLUME-TO-CAPACITY RATIO: 1.68
INTERSECTION LEVEL OF SERVICE: F

* ADJUSTED FOR RIGHT TURN ON RED ** APPROACHING OR EXCEEDING CAPACITY

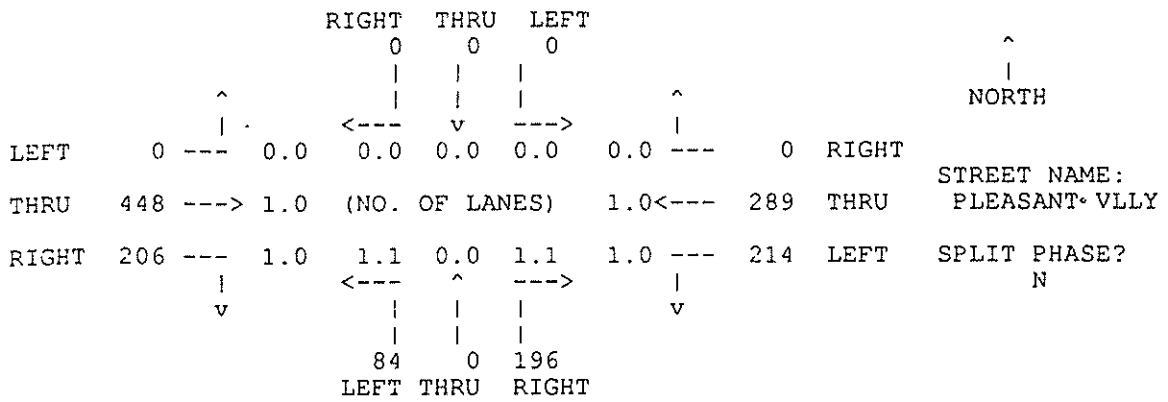
Developed by TJKM Transportation Consultants, Pleasanton, CA, 1989 YY

APPENDIX F

Results of "Existing Mitigated"
Intersection Capacity Analysis

TJKM INTERSECTION CAPACITY ANALYSIS 4/2/91

INTERSECTION 1 SR 49 and PLEASANT VLLY El Dorado County
COUNT DATE/TIME: PEAK HOUR:
CONDITION : MITIGATED EXISTING CONDITIONS FILE EX.VCI



STREET NAME: SR 49 SPLIT PHASE? N

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB RIGHT (R)	196	196	1500	0.1307	
LEFT (L)	84	84	1500	0.0560	
T + R + L		280	1500	0.1867	0.1867
EB RIGHT (R)	206	84 *	1500	0.0560	
THRU (T)	448	448	1650	0.2715	0.2715
WB THRU (T)	289	289	1650	0.1752	
LEFT (L)	214	214	1500	0.1427	0.1427
VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION:					0.60
ADJUSTMENT FOR LOST YELLOW TIME:					0.10
TOTAL VOLUME-TO-CAPACITY RATIO:					0.70
INTERSECTION LEVEL OF SERVICE:					B

* ADJUSTED FOR RIGHT TURN ON RED

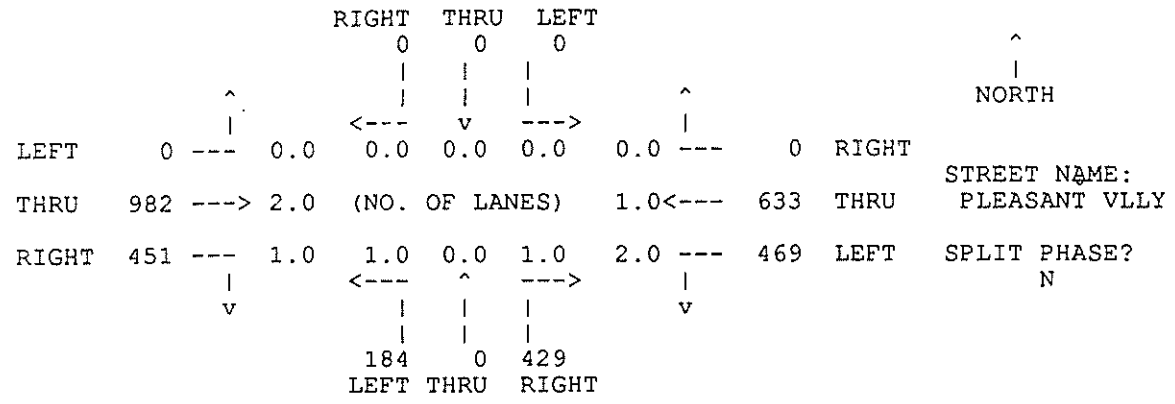
Developed by TJKM Transportation Consultants, Pleasanton, CA, 1989 YY

APPENDIX G

Results of "Cumulative Mitigated" Intersection Capacity Analysis

TJKM INTERSECTION CAPACITY ANALYSIS 4/2/91

INTERSECTION 1 SR 49 and PLEASANT VLLY El Dorado County
COUNT DATE/TIME: PEAK HOUR:
CONDITION : MITIGATED CULULATIVE CONDITIONS FILE EX.VCI



STREET NAME: SR 49 SPLIT PHASE? N

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB RIGHT (R)	429	219 *	1500	0.1460	0.1460
LEFT (L)	184	184	1500	0.1227	
EB RIGHT (R)	451	279 *	1500	0.1860	
THRU (T)	982	982	3300	0.2976	0.2976
WB THRU (T)	633	633	1650	0.3836	
LEFT (L)	469	469	2700	0.1737	0.1737

VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 0.62
ADJUSTMENT FOR LOST YELLOW TIME: 0.10

TOTAL VOLUME-TO-CAPACITY RATIO: 0.72
INTERSECTION LEVEL OF SERVICE: C

* ADJUSTED FOR RIGHT TURN ON RED

Developed by TJKM Transportation Consultants, Pleasanton, CA, 1989 YY