DRAFT

TRAFFIC ANALYSIS
FOR THE
GATEWAY TRANSIT PLAZA
UPPER LEVEL ROADWAY CONNECTION

Prepared for:

CATELLUS DEVELOPMENT CORPORATION

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EXECUTIVE SUMMARY

Crain & Associates has prepared this analysis to review the existing bus and auto circulation in the Gateway Transit Plaza and to analyze the potential impacts of constructing the Upper Level Roadway connection to the Plaza. The planning for the connection of the upper-level roadway is referenced in the MTA (1992) Headquarters EIR as a mitigation issue. Circulation improvements behind Union Station and a bus terminal are also prescribed as mitigation in the 1983 Metro Rail EIR. This connection would allow for better circulation within the greater Union Station area. Summarized in this document are results which show this roadway can be constructed with minimal traffic impacts to existing operations.

Long-range planning efforts for the area indicate a potential increase in traffic that may circulate between the Plaza side and the Union Station side. The proposed future traffic can be mitigated by implementing the recommendations listed below. Future traffic operations within the Plaza, as well as at key access points, would be improved should development continue around Union Station.

- Lane Designation Modification -- Redesignate lane widths on existing Upper Level Roadway (Plaza side) that will connect to the new Union Station level, thus allowing buses more turning area.

- Signal Activation -- Activate the existing traffic signal located at the Plaza/El Monte Busway/Upper Level Roadway connection, improving safety of vehicles traversing the intersection.

- Plaza Down Ramp Lane Designation -- Convert the lane designations for turning and through movements to reduce peak hour queuing of buses and autos exiting the Plaza to Vignes Street.

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- o Modify Signal Phasing -- Install new signal phasing and timing at the Vignes Street/Ramirez Street/Transit Plaza intersection to increase operational safety and the capacity for buses at this intersection.

With implementation of the above measures, traffic operations within the Plaza and on the connector road are expected to operate at good levels of service and actually solve existing as well as future traffic congestion and vehicular conflict issues.

INTRODUCTION

The Gateway Transit Plaza was constructed as part of the Gateway Center development, which included the Plaza and the Metropolitan Transportation Authority (MTA) headquarters building. MTA and Catellus Development Corporation jointly constructed the project through the creation of the Union Station Gateway (USG) Corporation.

The Plaza opened to bus service on October 22, 1995, and is comprised of eight bus loading bays and one large discharge area. A connection between the El Monte Busway and the Plaza was later completed, allowing eastbound Busway buses to enter and exit the Plaza. The facility connects bus patrons to the Metro Red Line, Amtrak, Metrolink, and other bus lines serving the Plaza.

Previous Gateway Center Planning

As part of the Plaza construction, a southern roadway, known as the "upper-level roadway," was planned to connect the Plaza to Union Station to the west, and to the proposed "Ramirez Flyover" to the east (connecting the Plaza to Ramirez Street). The planning for the connection of the upper-level roadway is referenced in the MTA (1992) Headquarters EIR as a mitigation issue. Circulation improvements behind Union Station and a bus terminal are also prescribed as mitigation in the 1983 Metro Rail EIR. In anticipation of the implementation of the proposed mitigations, the Plaza was designed and constructed to accommodate connections on the southern end of the Plaza adjacent to the El Monte Busway to Union Station on the west.

A signal system at the upper-level roadway/Plaza/El Monte Busway intersection was designed to accommodate traffic for the future connection. The signal was designed to control an intersection comprised of the planned roadway connection, vehicles entering

and exiting the El Monte Busway, autos on the Plaza that use this intersection to continue northbound on the Plaza roadway, and would accommodate the planned Ramirez Flyover.

EXISTING CONDITIONS

Existing Traffic Operations in the Gateway Transit Plaza

An analysis of current traffic conditions and bus operations was conducted within the Plaza and at the Vignes Street and El Monte Busway entrances. The majority of buses (89%) utilizing the Gateway Transit Plaza enter from the Vignes Street at Ramirez Street intersection. A small number of bus routes (11%) enter the Gateway Transit Plaza from the eastbound El Monte Busway. Figure 1 shows how local buses currently enter and exit the Plaza. As buses proceed up the entrance ramp from Vignes Street, they have the right-of-way to proceed left without stopping. Figure 2 shows the routing of buses exiting the El Monte Busway into the Plaza, and then proceeding to the nearby off-site bus layover area (known as MTA Terminal 31), then the route of returning buses to the Plaza to originate service. The eastbound route of buses on the El Monte Busway that continue east on the Busway after circulating the Plaza is shown on Figure 3, along with opposite westbound routing coming from the Santa Ana (101) Freeway.

Currently, MTA has 16 bus lines serving the Plaza. Fifteen lines terminate at the Plaza and continue to the Terminal 31 parking area. One additional PM peak hour only bus line passes through the Plaza and continues east on the El Monte Busway. Other transit services in the Plaza include one OCTA express line, one Santa Clarita express line, one Antelope Valley express line, two LADOT Dash lines, two LADOT Metrolink shuttles, and one USC Metrolink shuttle. All of these lines terminate in the Plaza. The Los Angeles County Sheriffs Department also uses the Transit Plaza to access the eastbound connection to the El Monte Busway, but does so on an irregular basis.

Non-transit vehicles can enter the Plaza from either Vignes Street or from the El Monte Busway entrance. These vehicles travel in a counter clockwise direction, as shown in Figure 4.

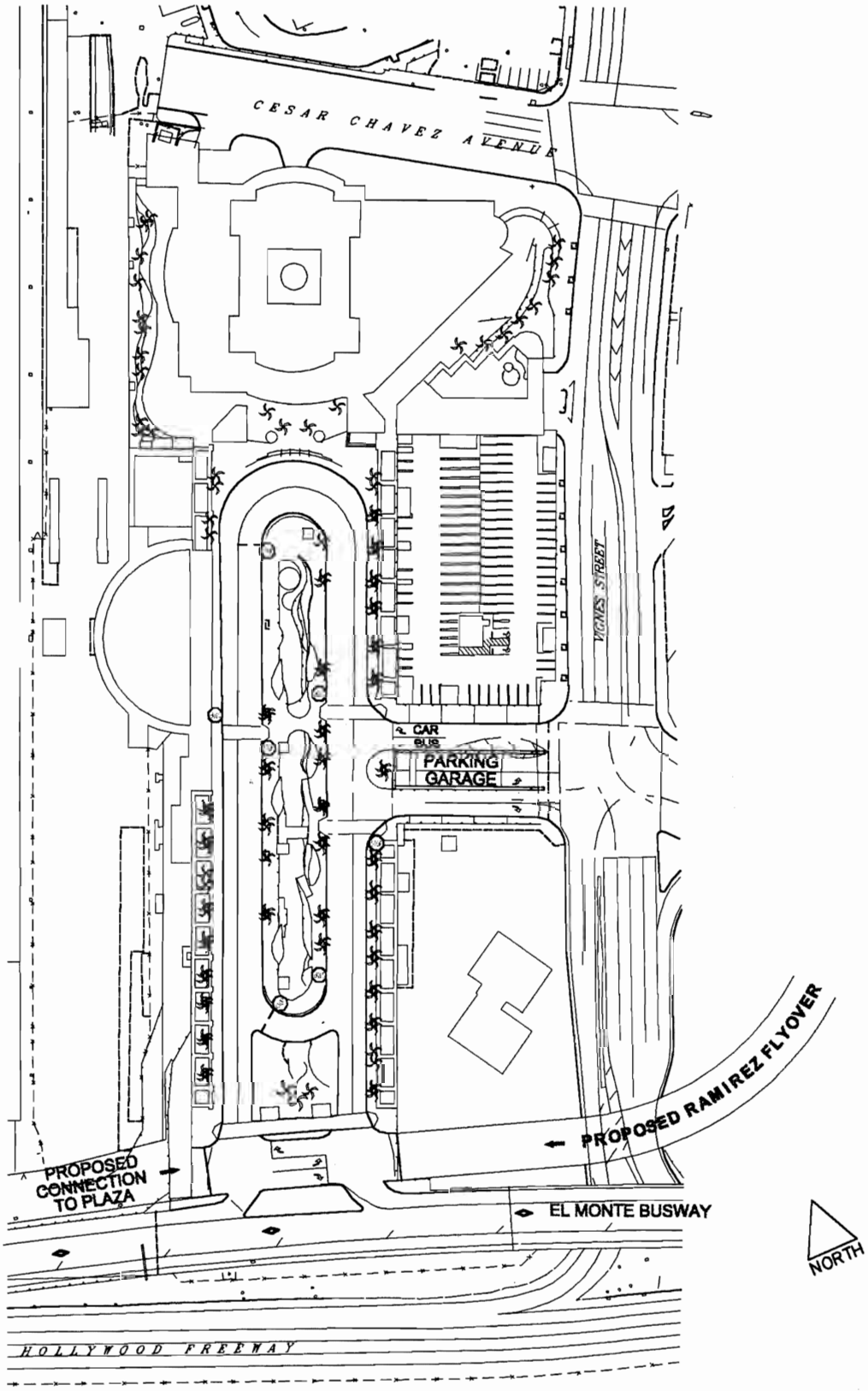

FIGURE 1

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:FN UNIONSTN\EXIST-BUS

GATEWAY TRANSIT PLAZA
EXISTING LOCAL BUS ROUTINGS

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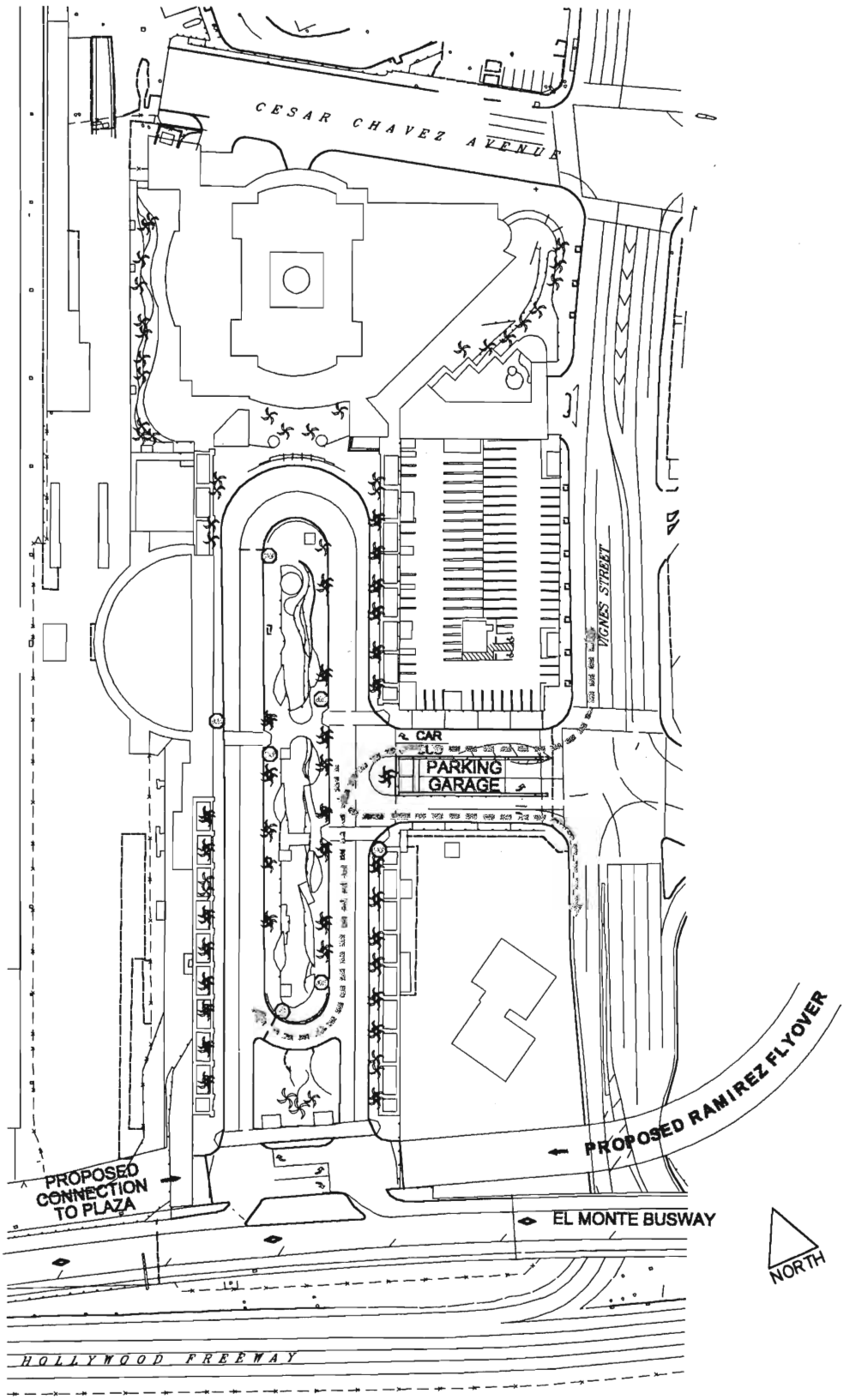

LEGEND

TERMINATING ROUTE TO THE PLAZA

ORIGINATING ROUTE TO THE PLAZA

FIGURE 2

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:FN UNIONSTN\EXIST-EXPRESS

GATEWAY TRANSIT PLAZA
EXISTING ROUTING FOR
EXPRESS BUSES ORIGINATING/TERMINATING AT PLAZA

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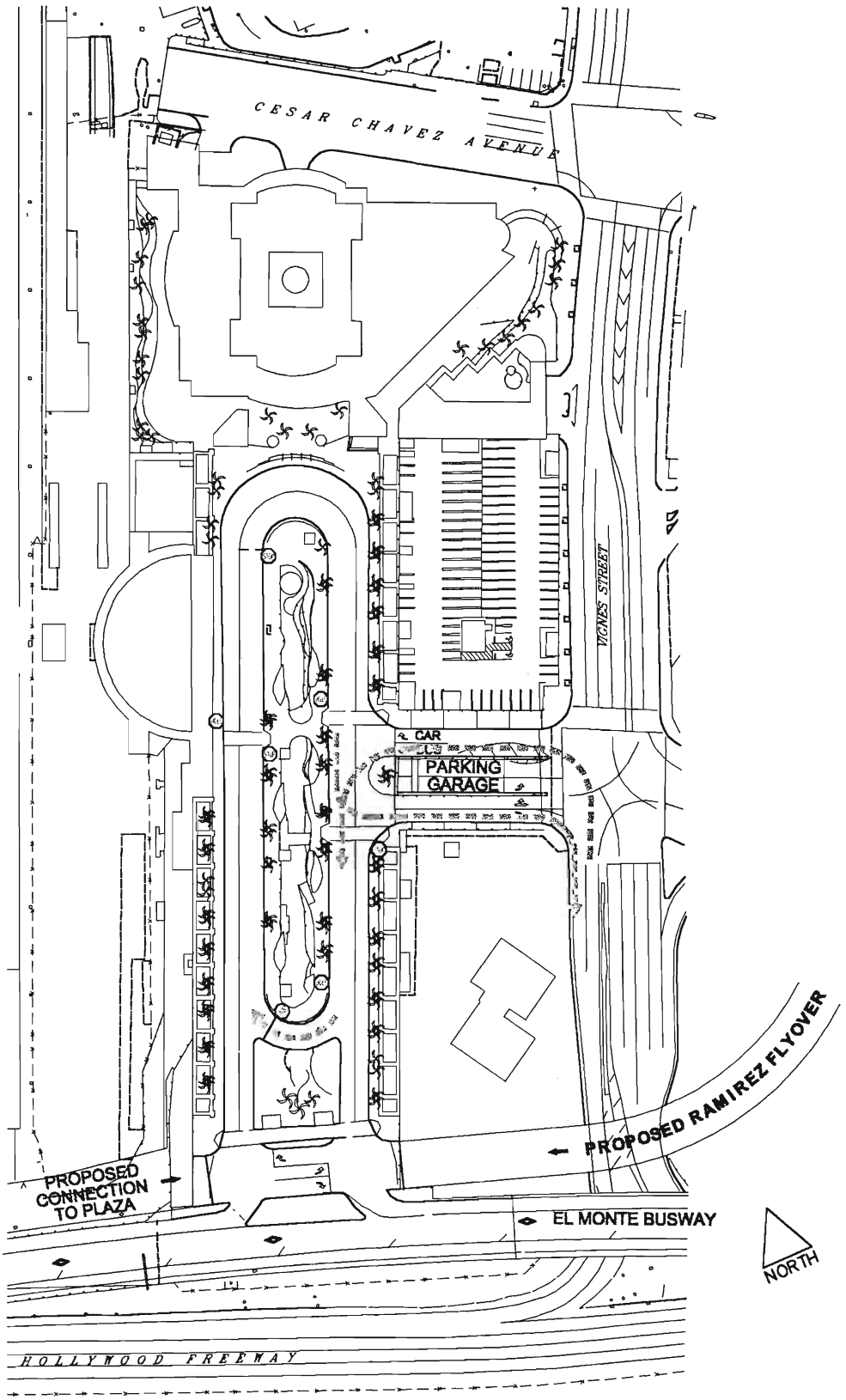

LEGEND

EASTBOUND ROUTE

WESTBOUND ROUTE

FIGURE 3

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:FN UNIONSTN\EXIST-ELMONTE

GATEWAY TRANSIT PLAZA
EXISTING EL MONTE BUSWAY
EXPRESS BUS ROUTING
(MTA LINE 497 ONLY)

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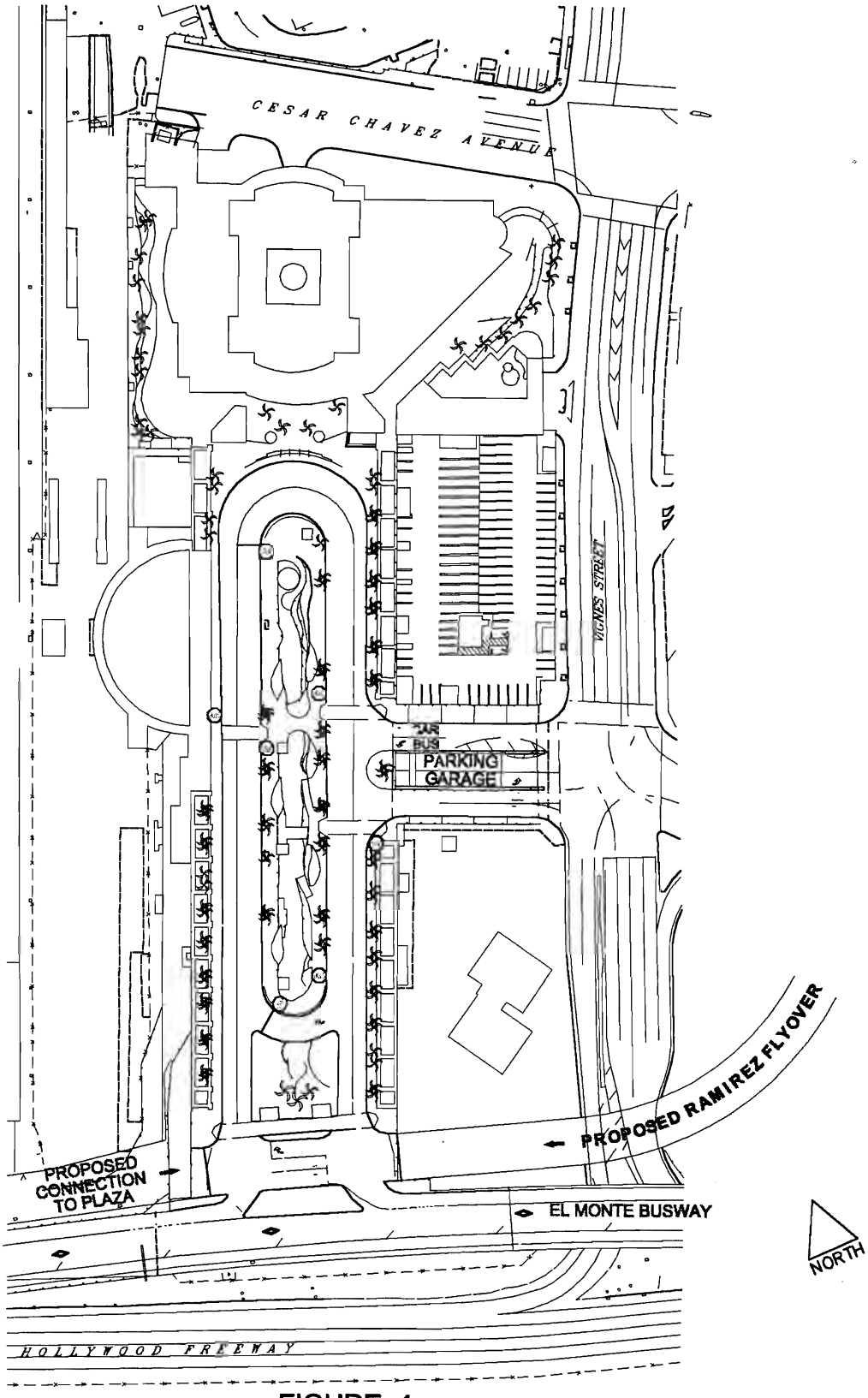

FIGURE 4

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:FN UNIONSTN\EXIST-AUTO

GATEWAY TRANSIT PLAZA
EXISTING AUTOMOBILE ROUTING

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Gateway Transit Plaza Traffic Volumes

Approximately 1,600 total bus trips are scheduled to and from the Plaza. This number is deceiving, as buses scheduled to the Plaza as a final destination do not enter the Plaza unless passengers are on-board destined to a stop inside the Plaza. Those buses without passengers proceed directly to Terminal 31 across the street. This scheduling technique reduces the number of buses needlessly circling the Plaza with no passengers on-board. Based on a recent traffic survey at the Plaza, the number of scheduled (all-day) trips to the Plaza is approximately 500 more than actually enters and circulates the inner roadway.

Upon reviewing traffic counts supplied by LADOT for the intersection of Vignes Street and Ramirez Street, a break down of where vehicles were going once they entered the Gateway Center facility was unknown. Further, the review of the traffic analysis data prepared by a consultant as part of the transportation analysis for the proposed MTA headquarters building and Transit Plaza shows that improper bus routes had been listed as serving the Plaza, while those routes now serving the Plaza were not considered in the analysis. Additionally, early planning of the Plaza indicated retail would be developed around the Plaza. Retail-generated trip data was also included in the original traffic analysis, but no retail has been developed to date.

To properly reflect the actual number of buses and autos circulating the Plaza during the base and peak periods, a traffic survey was conducted from 6:00 AM through 6:00 PM on April 14, 1999. The Vignes Street Plaza entrance ramp, the down ramp to the Gateway Center garage, and the El Monte Busway entrances were surveyed. The total survey traffic results for buses entering the Plaza are shown in Table 1.

Table 1
Daily Bus Activity Counts in the
Gateway Transit Plaza

Buses Entering the Plaza from Vignes Street	897
Buses Entering the Plaza from the El Monte Busway	102
Total Buses Circulating the Plaza	999

Automobile traffic is not restricted from entering the Plaza. As autos proceed up the entrance ramp from Vignes Street, they have the right-of-way to proceed right without stopping. Autos enter the Plaza from the Vignes Street/Ramirez Street intersection and circle the Plaza in a counter-clockwise direction, as previously shown in Figure 4. Autos are the only vehicles that cross the path of buses coming from the eastbound El Monte Busway into the Plaza. At this time, the southern intersection of the Plaza roadways with the entrance and exit to the Busway is treated as a "T" style intersection with stop signs.

The existing three-phase traffic signal system in place is not activated at this time, however, the signal-phasing plan (if activated) is shown as currently engineered in Figure 5. The first phase sequence allows the left turn off of the Busway and the exiting of buses from the Plaza where they turn either right on the connection roadway, or turn left to enter the eastbound Busway. The second phase sequence allows southbound autos to turn left onto the upper level roadway connection, and vehicles waiting in the connection intersection can proceed left back onto the Plaza roadway, or turn left onto the eastbound Busway. Finally, the third phase allows for pedestrians to cross, and vehicles (including autos) waiting in the connection intersection can proceed right onto the eastbound El Monte Busway.

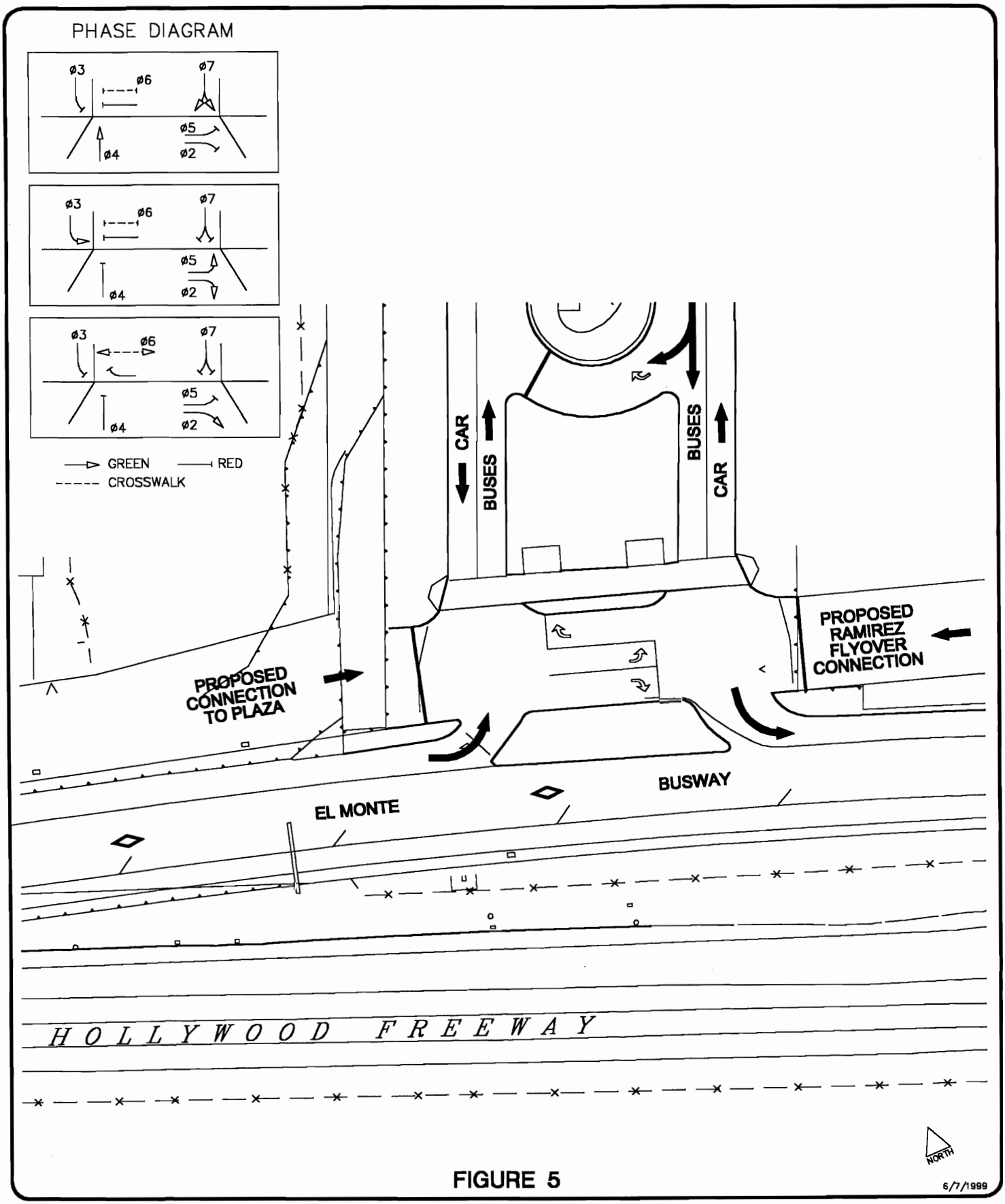

FIGURE 5

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EXISTING SIGNAL PHASING AT PLAZA / EL MONTE BUSWAY INTERFACE

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As part of the April 14 Plaza bus count, autos were also counted. The total number of autos entering the Plaza during the 12-hour survey period is reflected below in Table 2.

Table 2
Auto Activity Counts in the
Gateway Transit Plaza

Autos Entering the Plaza from Vignes Street	83
Autos Entering the Plaza from El Monte Busway	23
Total Autos Circulating the Plaza	106

From the total twelve-hour traffic count, peak hour data is shown in Figure 6. This figure best shows how traffic traversing the Vignes Street/Ramirez Street intersection sort out as they enter the Plaza roadway system. Notice that the AM peak hour data for buses is lighter than in the afternoon. As previously mentioned, buses terminating at the Plaza with no patrons on board do not have to enter the Plaza, but may proceed to Terminal 31. In the morning period, the Plaza is mostly a destination for MTA and MWD employees. The majority of the users are from Metrolink and Amtrak. But in the afternoon, train users drive the number of bus volumes upward, as they tend to use DASH and Metrolink shuttles in the morning to depart the Plaza, but return back to Union Station on a variety of MTA lines.

Existing Traffic Conditions on Surrounding Streets

The existing roadway system serving the Gateway Transit Plaza has been substantially improved over the years, including widenings along both Cesar E. Chavez Avenue and Vignes Street associated with the construction of the MTA Headquarters Building at the Gateway Center. The terminus of the northbound Santa Ana (101) Freeway Vignes Street off-ramp was also widened substantially to provide dual

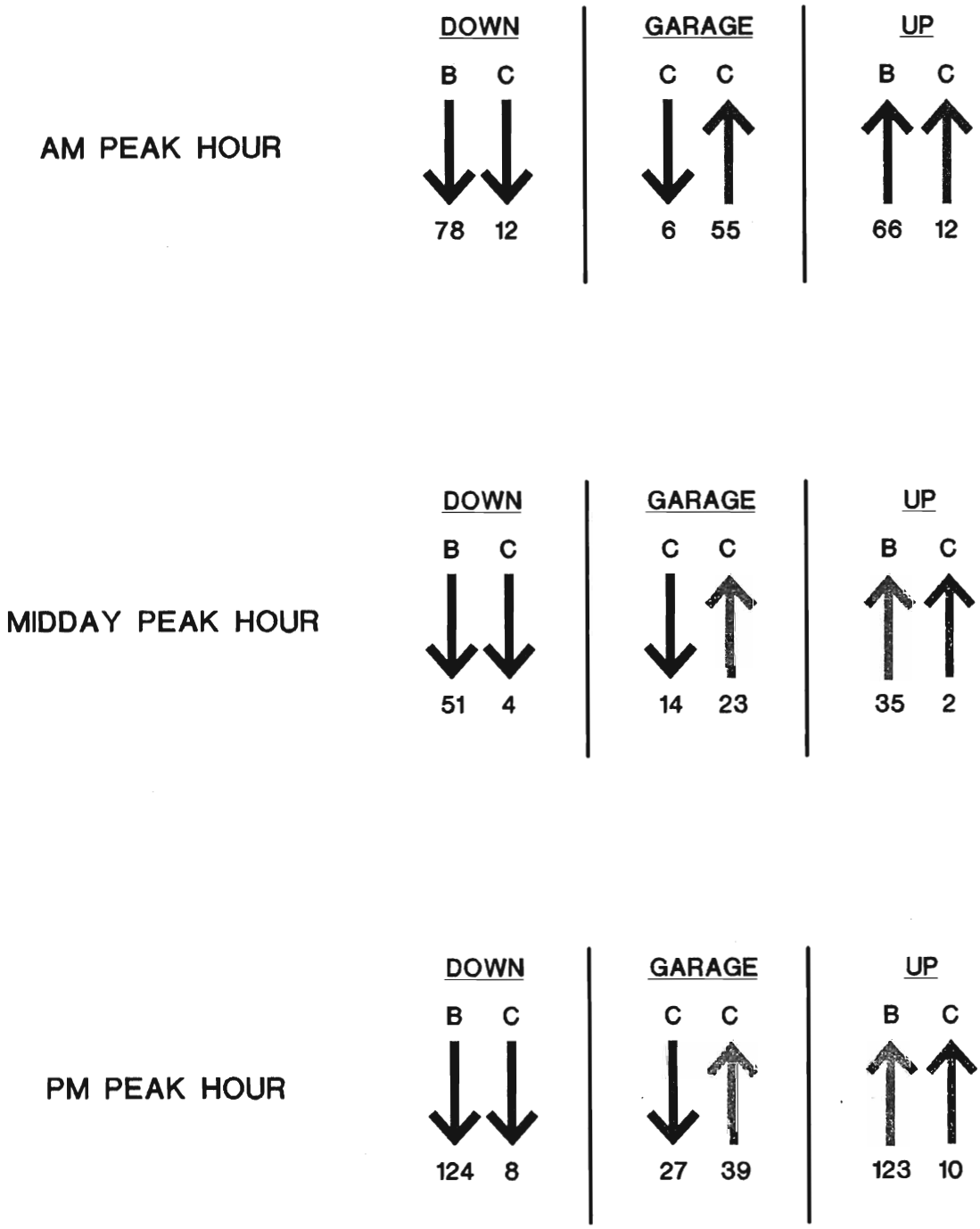

FIGURE 6

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GATEWAY TRANSIT PLAZA
EXISTING PEAK HOUR TRAFFIC VOLUMES
PLAZA/GARAGE RAMPS

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left-turns lanes into the Transit Plaza, two through lanes into northbound Vignes Street and a separate right-turn-only lane to southbound Ramirez/Center Street. At this same location, the southbound approach of Vignes Street provides dual left-turn lanes to Ramirez Street and two through lanes onto the northbound freeway on-ramp, with right turns into the Transit Plaza also allowed from the curb lane. The Ramirez Street approach has three lanes, including a left-turn lane, a shared right-turn/through (into the Plaza) lane, and a right-turn-only lane.

In general, both the Cesar E. Chavez Avenue and Vignes Street provide two through lanes in each direction, as well as left-turn channelilzation at most intersections. At the intersection of the two streets, added width is provided for right-turn-only lanes on all four approaches. Additionally, there is sufficient width to provide dual left-turns lanes in all directions if the need exists in the future.

The existing traffic volumes in the vicinity of the Gateway Transit Plaza, particularly at both entry and exit points, are provided in Figures 7 through 9 for the AM peak hour period, a midday hour period, and the PM peak hour period, respectively. The traffic volumes entering and exiting the Plaza are based on manual traffic counts which were performed on Wednesday, April 14, 1999. Other recent count data were obtained from both manual and automatic counts available from the City of Los Angeles Department of Transportation. These counts were adjusted on a basis of our more recent driveway count data and otherwise adjusted to the current year by applying an areawide growth factor of one percent per year.

Other data pertaining to intersection geometrics and traffic signal operations were obtained through field operations, LADOT, and Catellus Development Corporation.

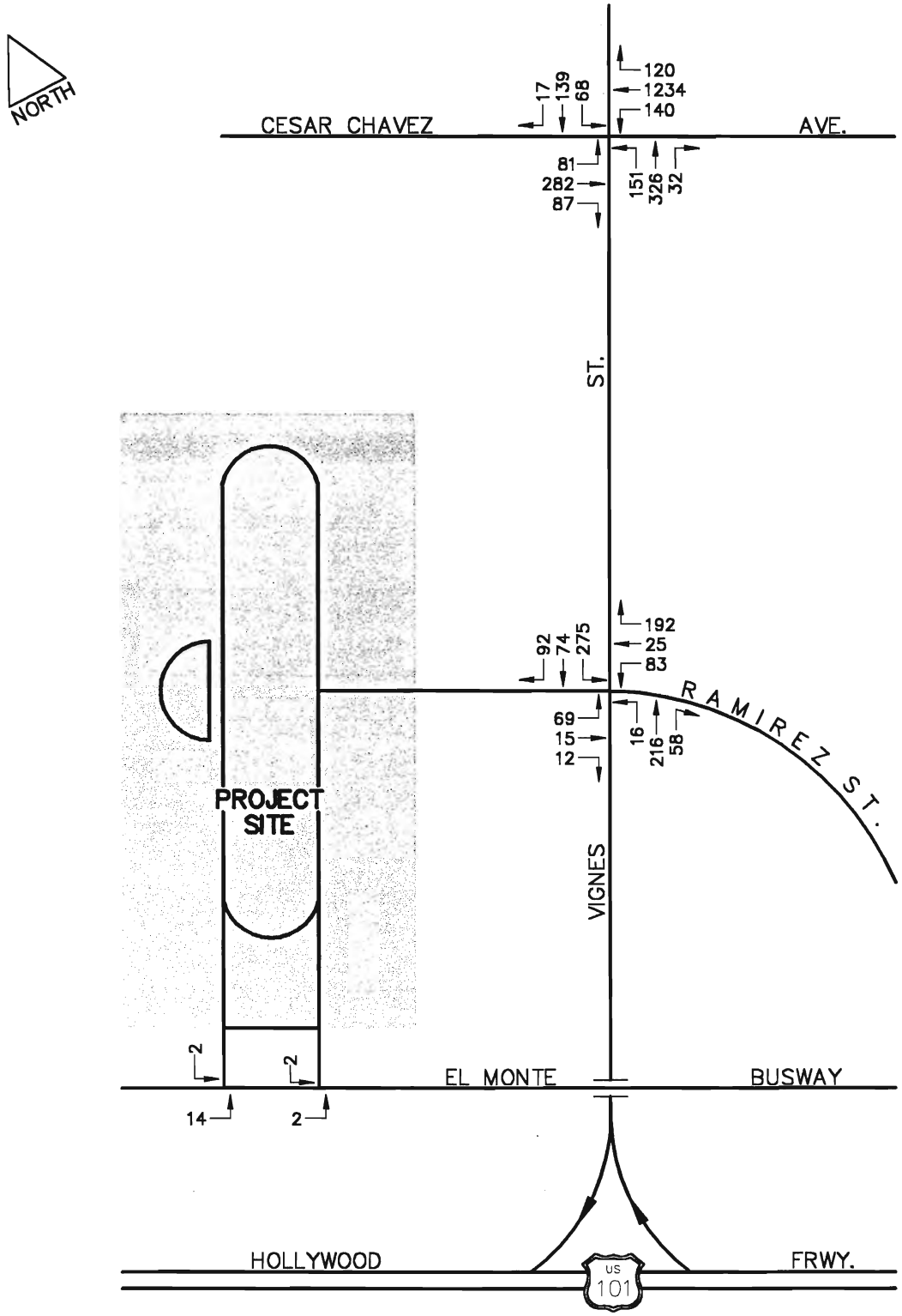

FIGURE 7

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FN: UNIONSTN\AMPEAK

EXISTING (1999) TRAFFIC VOLUMES
AM PEAK HOUR

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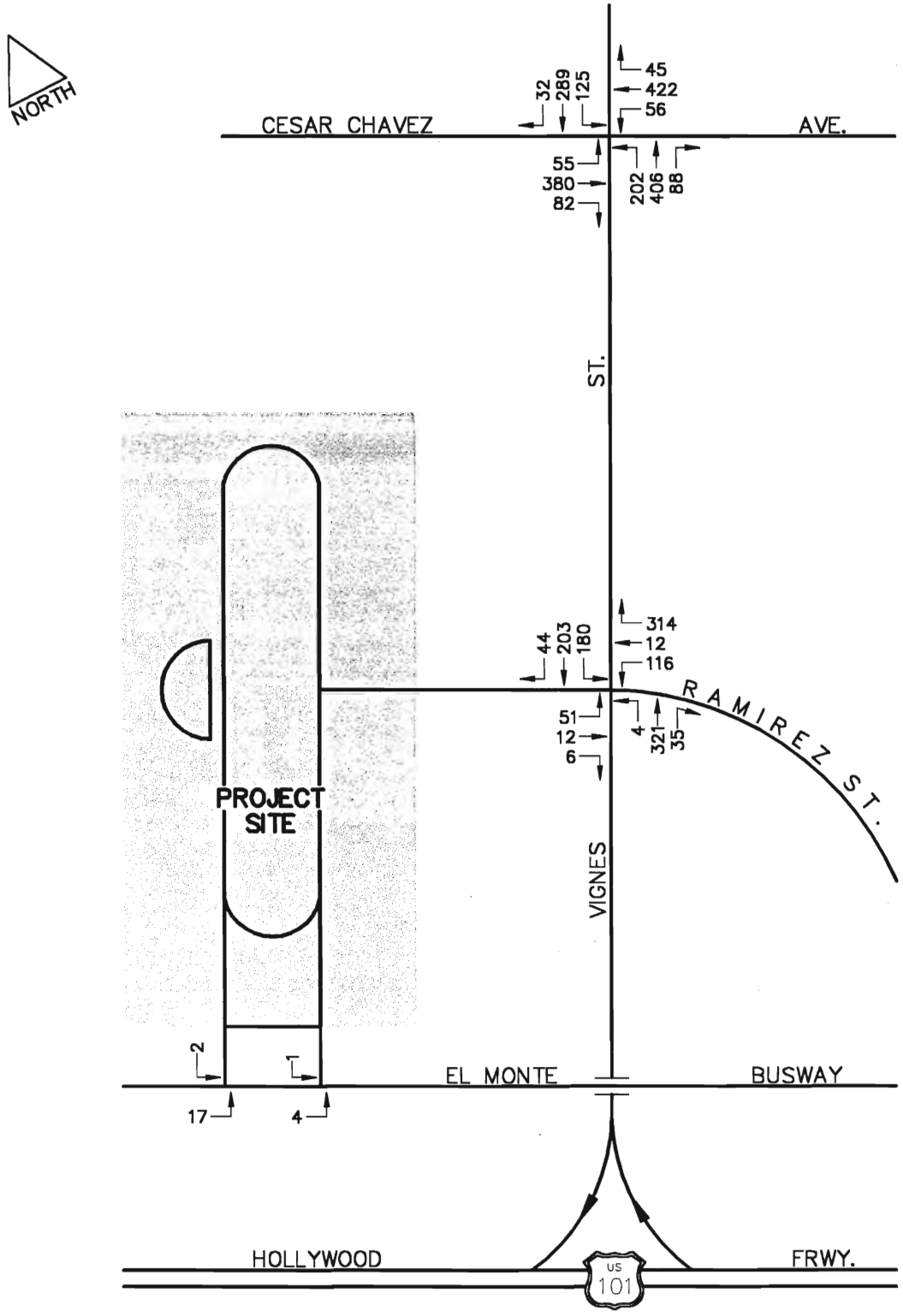

FIGURE 8

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FN: UNIONSTN\MIDPEAK

EXISTING (1999) TRAFFIC VOLUMES
MIDDAY PEAK HOUR

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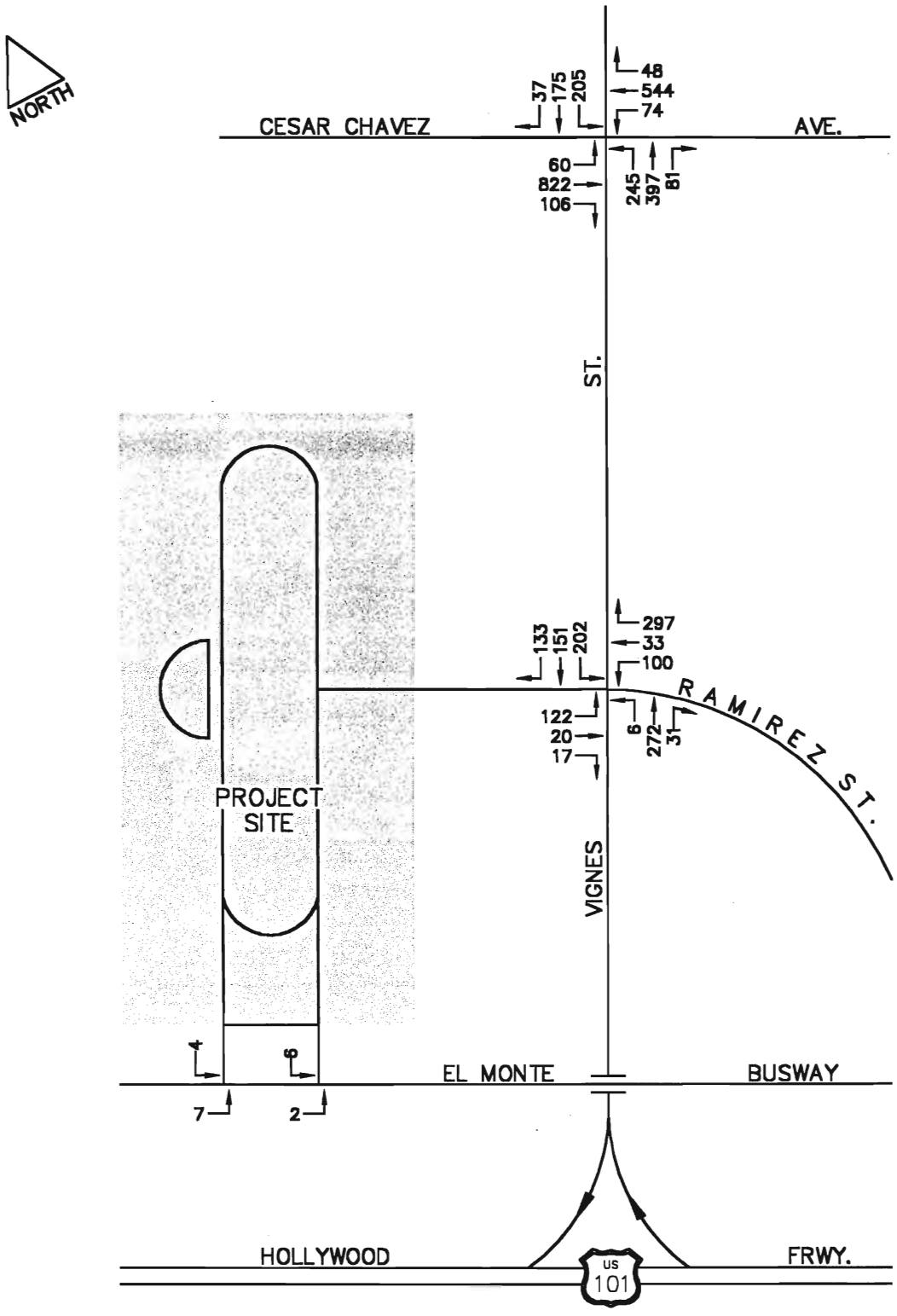

FIGURE 9

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FN: UNIONSTN\PMPEAK

EXISTING (1999) TRAFFIC VOLUMES
PM PEAK HOUR

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Traffic Signal Operation

A traffic signal currently controls traffic at the intersection of Vignes Street, Ramirez Street, the northbound Santa Ana Freeway off-ramp, and the Gateway Transit Plaza driveways which provide access to the plaza as well as to the parking structure beneath the Plaza. Another traffic signal has been installed at the other entrance/exit to the Transit Plaza, at the south end where it currently ties into the eastbound El Monte Busway facility. With a proposed connection to the upper level roadway system serving Union Station and a continuation roadway which ties into Ramirez Street (the "Ramirez Flyover"), there will be added approaches to this second signalized intersection and added traffic that must be controlled.

As shown in Figure 10, the intersection at Vignes Street and the Transit Plaza driveway has been improved to a fairly large, high-capacity intersection. This intersection was reconstructed as part of the MTA building and Plaza construction. Vignes Street aligns directly with the Santa Ana Freeway on/off-ramps, with both approaches providing two through lanes and dual left-turn lanes. An additional right-turn-only lane is provided for off-ramp traffic turning onto Ramirez Street. The signalized control of these approaches is typical of an urban intersection with separate left-turn phasing. An overlap is also provided for the Ramirez Street right-turn movement concurrently with the southbound Vignes Street left-turn movement. Because of the skew of Ramirez Street and the lane configurations on Ramirez Street and the Plaza/garage exits, these signal phases have been split. That is, the signal timing for both approaches is independent of each other and the movements occur sequentially rather than concurrently. It should also be noted that bus movements, including left turns onto Vignes Street, from the upper level roadway are accommodated in the middle and southerly of the three-approach lane. The third lane, the most northerly, is the exit from the garage and, because of the left turn allowed for the buses, motorists are only allowed to turn left from this lane.

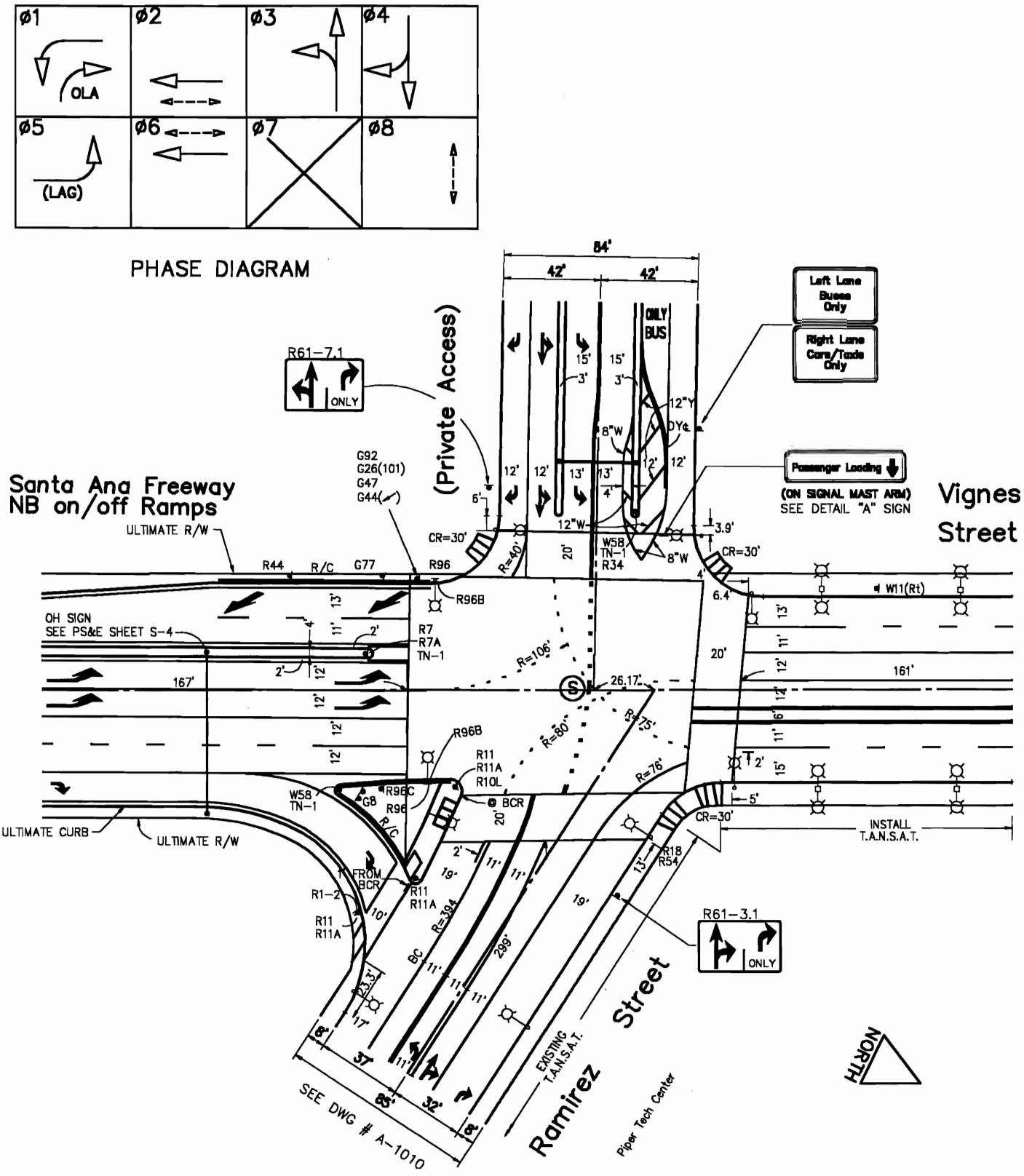

FIGURE 10

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:FN UNIONSTN\RAMVIGSIG

EXISTING INTERSECTION GEOMETRICS AND SIGNAL PHASING

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Analysis of Existing Traffic Conditions

An analysis of current traffic conditions was conducted on the streets and highways serving the project area. Detailed traffic analyses of existing conditions were performed at the following two intersections:

- Vignes Street and Ramirez Street, including the northbound Santa Ana (101) Freeway on-off ramps and the Gateway Transit Plaza ramps
- Vignes Street and Cesar E. Chavez Avenue

The traffic analysis was performed through the use of established traffic engineering techniques. Updated traffic count data were utilized so as to reflect any recent changes in traffic demand patterns. Other data pertaining to intersection geometrics, parking-related curb restrictions and signal operations were obtained through field surveys of the study locations.

The methodology used in this study for the analysis and evaluation of traffic operations at each study intersection is based on procedures outlined in Circular Number 212 of the Transportation Research Board.[1] In the discussion of Critical Movement Analysis for signalized intersections, procedures have been developed for determining operating characteristics of an intersection in terms of the "Level of Service" provided for different levels of traffic volume and other variables, such as the number of signal phases. The term "Level of Service" describes the quality of traffic flow. Levels of Service A to C operate quite well. Level D typically is the level for which a metropolitan area street system is designed. Level E represents volumes at or near the capacity of the highway which might result in stoppages of momentary duration and fairly unstable flow. Level F

---

[1] Interim Materials on Highway Capacity, Circular Number 212, Transportation Research Board, Washington, D.C., 1980.

occurs when a facility is overloaded and is characterized by stop-and-go traffic with stoppages of long duration.

A determination of the Level of Service at an intersection, where traffic volumes are known or have been projected, can be obtained through a summation of the critical movement volumes at that intersection. Once the sum of critical movement volumes has been obtained, the values indicated in Table 3 can be used to determine the applicable Level of Service.

Table 3
Critical Movement Volume Ranges*
For Determining Levels of Service

Level of Service	Maximum Sum of Critical Volumes (VPH) Two Phase	Three Phase	Four or More Phases
A	900	855	825
B	1,050	1,000	965
C	1,200	1,140	1,100
D	1,350	1,275	1,225
E	1,500	1,425	1,375
F	----------Not Applicable----------		

* For planning applications only, i.e., not appropriate for operations and design applications.

"Capacity" represents the maximum total hourly vehicle volume movement in the critical lanes which has a reasonable expectation of passing through an intersection under prevailing roadway and traffic conditions. For planning purposes, capacity equates to the maximum value of Level of Service E, as indicated in Table 3. The Critical Movement Analysis (CMA) indices used in this study were calculated by dividing the sum of critical movement volumes by the appropriate capacity value for the type of signal control present or proposed at the study intersections. Thus, the Level of Service corresponding to a range of CMA values is shown in Table 4.

Table 4
Level of Service
As a Function of CMA Values

Level of Service	Description of Operating Characteristics	Range of CMA Values
A	Uncongested operations; all vehicles clear in a single cycle.	< 0.60
B	Same as above.	>0.60 < 0.70
C	Light congestion; occasional backups on critical approaches.	>0.70 < 0.80
D	Congestion on critical approaches, but intersection functional. Vehicles required to wait through more than one cycle during short peaks. No long-standing lines formed.	>0.80 < 0.90
E	Severe congestion with some long-standing lines on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements.	>0.90 < 1.00
F	Forced flow with stoppages of long duration.	> 1.00

By applying this analysis procedure to the study intersections, the Critical Movement Analysis (CMA) value and the corresponding Levels of Service (LOS) for existing traffic conditions were calculated. Those values, for existing (1999) AM, Midday and PM peak hour conditions, are shown in Table 5.

Table 5
Critical Movement Analysis Summary
For Existing (1999) Traffic

Intersection	AM Peak Hour		Midday Period		PM Peak Hour	
	CMA	LOS	CMA	LOS	CMA	LOS
Vignes St./Ramirez St.	0.235	A	0.238	A	0.273	A
Vignes St./Cesar Chavez Ave.	0.606	B	0.375	A	0.576	A

Review of the above values shows that peak hour conditions at the two study intersections are operating good levels of service, with surplus capacity. At Cesar Chavez Avenue and Vignes Street, midday and afternoon conditions are better than morning peak hour conditions at all intersections. At the Plaza ramp/Ramirez Street/Vignes Street intersection, conditions are better in the morning and midday period than in the afternoon period.

ANALYSIS OF THE UPPER LEVEL ROADWAY CONNECTION

The primary purpose of this study is to analyze the potential traffic impacts to the Gateway Transit Plaza that would be caused by the completion of the upper level roadway connection between Union Station and the Transit Plaza. When such a facility is completed and opened to traffic, this new automobile traffic will intermix with vehicles currently operating in the Plaza. Perceived issues of concern are potential added delay to the bus traffic, and safety concerns because of the possible auto/bus conflicts. Both of these issues are primarily related to the queuing at various locations around the Plaza (mainly at the exit driveway), and the lane configurations and signal controls at the access point.

In the subsequent sections of this report, the projected volumes of traffic that will use the upper level roadway connection for access into and out of the Union Station area will be estimated and the impacts will evaluated. Due to potential long-range planning traffic as new buildings are constructed to the west of the Plaza, several operational and safety improvements are also suggested and evaluated that could be implemented at a later date.

Projected Roadway Traffic Volumes with Upper Level Connection

In simplest terms, the amount of traffic that will use the upper level roadway connection is directly related to the amount of traffic entering and leaving the Union Station area. It is not expected that any other traffic would use this new roadway connection as a short-cut through the area because of the circuitous routing through the Transit Plaza, particularly for autos entering the Plaza from Vignes Street. It has been assumed that the new traffic traversing the Plaza would be limited and mainly used by commuters who work within the Union Station area, mainly at the Metropolitan Water District (MWD) Headquarters Building. In checking with the MWD Rideshare Coordinator, it is predicted that only 8 to 10 vanpools would access the El Monte Busway from the upper level roadway. Shuttles or taxis serving Union Station might also use it on a very limited

WHY? PEAK PERIOD MAKES MORE SENSE CURRENTLY THEY ARE ON THE NORTH & WEST SIDE OF UNION STATION.

[redacted] Other traffic at Union Station would continue to use the existing driveways along Alameda Street and Cesar E. Chavez Avenue as the easiest and most direct access for activities related directly to Union Station.

An actual analysis of exiting driveway activity was performed to provide an indication of the various uses at Union Station and the MWD Building. The level of activity associated with these two primary uses is summarized below in Table 6 in terms of the AM and PM peak hour trip making patterns into and out of the Union Station site.

Table 6
Existing Peak Hour Traffic Activity
At Union Station

Intersection	AM Peak Hour Inbound	AM Peak Hour Outbound	PM Peak Hour Inbound	PM Peak Hour Outbound
Vignes St./Ramirez St.	234	174	189	219
Vignes St./Cesar Chavez Ave.	415	57	77	374

For purposes of this study, as discussed above, the use of the upper level roadway connection during the peak hour periods mainly relates to the commuter traffic into and out of the MWD Building. For this study, [redacted] was made that [redacted]: During the midday period it was assumed that trip making in and out of the Union Station area via the new roadway connection will equate to approximately 5 percent of the parking supply available at the MWD. Although this estimate is based on MWD parking, the traffic using the new route will likely result both from office-related trips and others more directly associated with Union Station.

WHY CONSERVATIVE ROADS ARE NOT BUILD USING CONSERVATIVE ASSUMPTIONS

These traffic demands were distributed and assigned to primarily represent Union Station/MWD travel coming from or leaving towards the east, with most of that travel occurring along the freeways, such as the Santa Ana (101) Freeway to the southeast and

the San Bernardino (10) Freeway to the east. Only 20 percent of the trips were assumed to come from or exit to the north along Vignes Street, and most (75%) of that traffic proceeds along Cesar E. Chavez Avenue to the east of Vignes Street. It should also be noted that 15 percent of the traffic exiting the Union Station area and using the new Upper Level Roadway connection, will access the eastbound El Monte Busway directly via the existing connection at the south end of the Gateway Transit Plaza. Westbound traffic that utilizes the Busway is routed differently. That traffic transitions from the Busway to the Santa Ana (101) Freeway just east of the Los Angeles River. Then, they exit the freeway at the Vignes Street off-ramp and turn left into the Plaza entrance.

The results of the new traffic being added to the Gateway Transit Plaza and to the two adjacent study intersections are shown graphically in Figures 11, 12 and 13, for the AM peak hour, the midday period, and the PM peak hour, respectively. Similar to the analysis of existing traffic conditions, critical movement analyses were performed for the new (increased) traffic volumes at the two study locations. The results of this analysis are summarized in Table 7, below.

Table 7
Critical Movement Analysis Summary
With Traffic Using Upper Level Roadway Connection

Intersection	AM Peak Hour		Midday Period		PM Peak Hour	
	CMA	LOS	CMA	LOS	CMA	LOS
Vignes St./Ramirez St.	0.241	A	0.262	A	0.306	A
Vignes St./Cesar Chavez Ave.	0.606	B	0.377	A	0.578	A

These results indicate that there will be very little net impact of the Upper Level Roadway connection on either of the study intersections during all three of the time periods that were analyzed. The largest net increase of 16 percent in any of the CMA

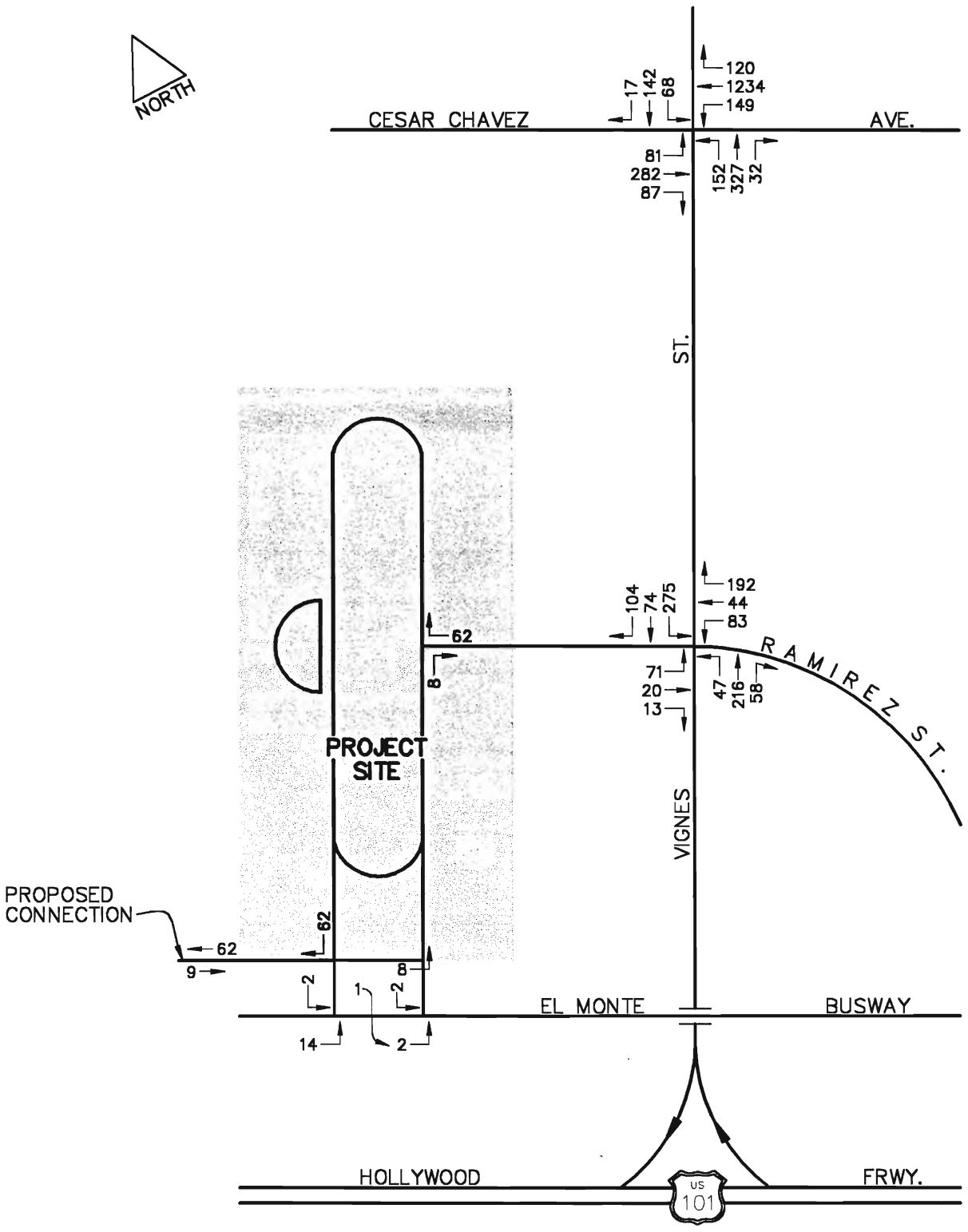

FIGURE 11

6/7/99

FN: UNIONSTN\AMCONN

PROJECTED (1999) TRAFFIC VOLUMES
WITH CONNECTOR
AM PEAK HOUR

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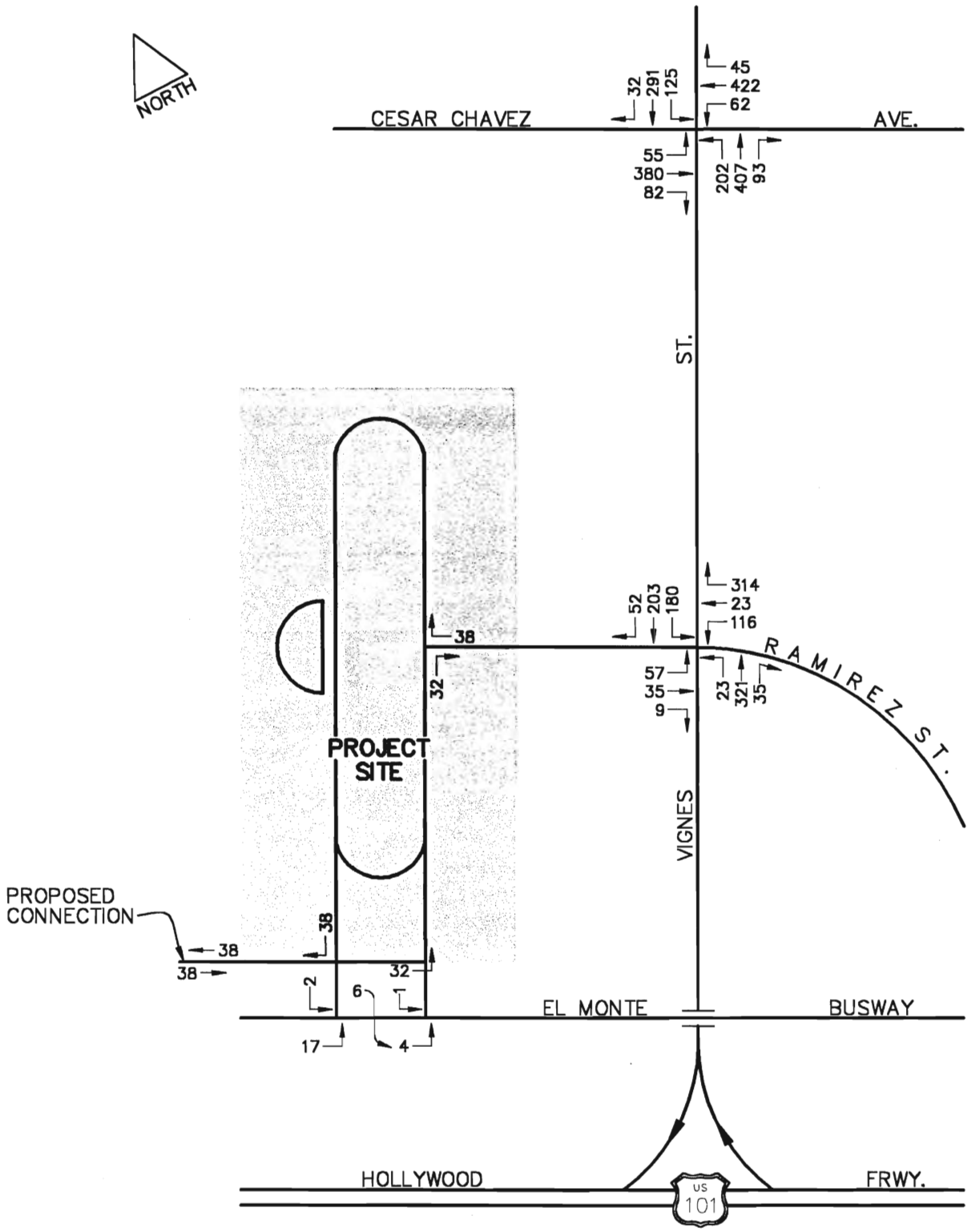

FIGURE 12

6/7/99

FN: UNIONSTN\MIDCONN

PROJECTED (1999) TRAFFIC VOLUMES
WITH CONNECTOR
MIDDAY PEAK HOUR

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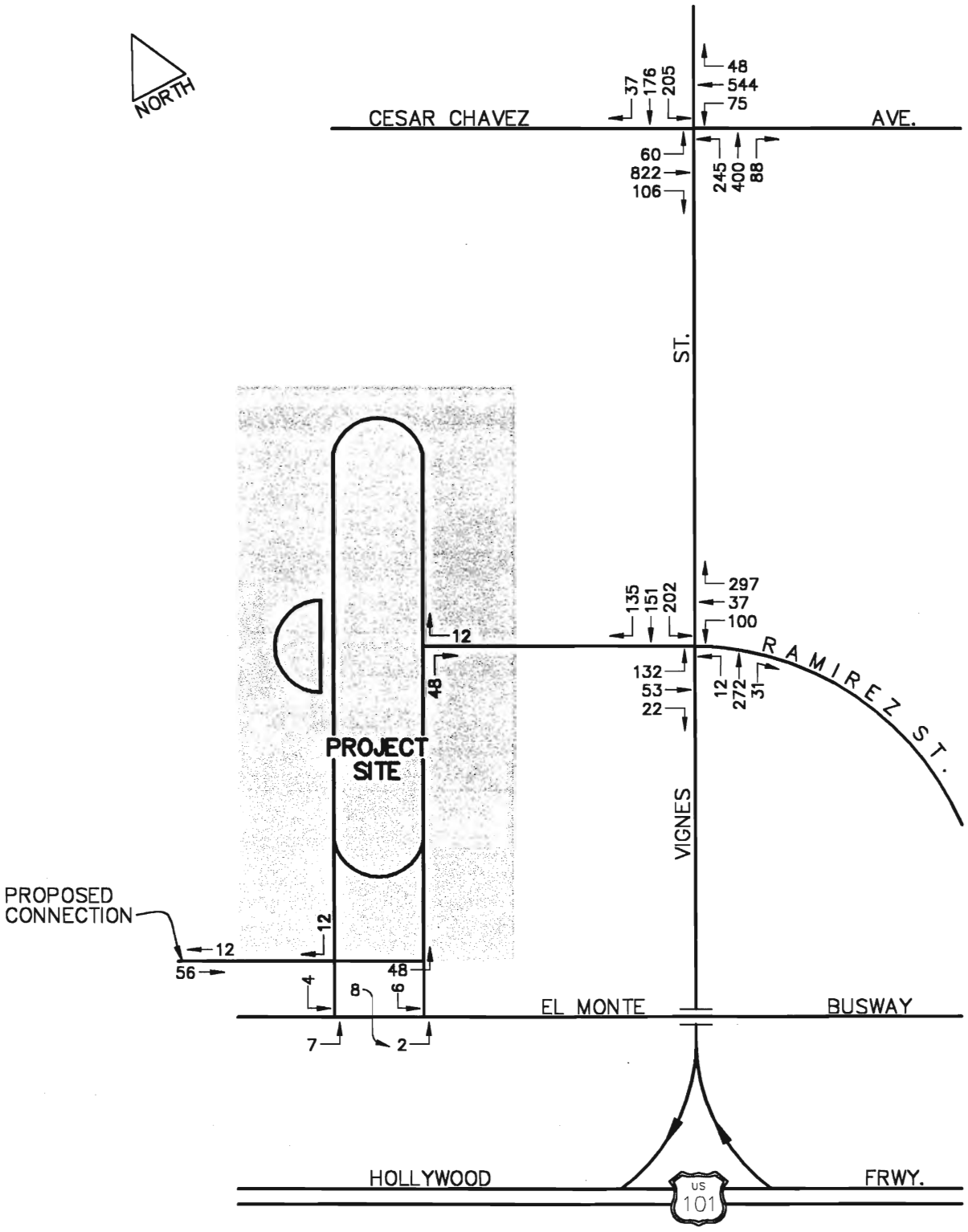

FIGURE 13

6/7/99

FN: UNIONSTN\PMCONN

PROJECTED (1999) TRAFFIC VOLUMES
WITH CONNECTOR
PM PEAK HOUR

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values between existing conditions and the added connection occurred during the PM period at the Vignes Street/Ramirez Street intersection. Additionally, the increased traffic activity at the signalized intersection at the south end of the Plaza, where it interfaces with the Upper Level Roadway connection and the eastbound El Monte Busway, will have a nominal impact on Plaza traffic operations. On average, fewer than two vehicles per minute traverse this southern intersection during the midday period when overall bus and automobile traffic volumes are assumed to be at their highest levels. INCORRECT STATEMENT PEAK PERIOD

These relatively small volumes traverse other portions of the Gateway Transit Plaza where the potential impacts on bus operations could be more serious, particularly if the added automobile traffic interferes with bus operations and causes substantial delays. In this case, the PM peak hour period is the most critical because approximately 48 vehicles per hour are expected to turn right from the Plaza onto the exit ramp at the same location that buses turn left onto that same ramp. As discussed elsewhere in this report, the buses have priority over automobile movements at the Plaza/entrance-exit ramps. Because of the relatively light automobile traffic volumes (less than one per minute, on average), it is again concluded that the net impact on bus operations would be very small.

Proposed Future Operational Improvements

In conjunction with future construction of new office buildings, some operational improvements can be implemented to improve traffic circulation from potential added congestion. It is proposed that, instead of the split east/west phasing at the intersection of Vignes Street, Ramirez Street, and the Transit Plaza, that the Ramirez Street phase run simultaneously with the garage exit, which currently has very low volumes. The two lanes on the exit ramp from the Transit Plaza, however, would remain on a separate split phase. This change would require a modification of the signal displays, with several programmed visibility signal heads which can be seen from one portion of the

driveway but not from another part of the driveway. Other changes would include some rewiring of the traffic signal and the reassignment of some of the detector loops to the different phases.

The proposed change in operation would resolve two problems with the current signal operation. First, buses would be allowed to make the left turn into either of the two northbound lanes on Vignes Street without competing with autos. These buses are currently required to make a lane change in a very short distance in order to get into the left-turn lane for Cesar Chavez Avenue.

The other problem that would be resolved is that motorists who are exiting the parking garage sometimes proceed straight onto Ramirez Street or turn right to access the northbound freeway on-ramp. These movements are not legally permitted because of the conflict with the concurrent bus movements exiting the Transit Plaza, in the next lane to the right. The accident potential that currently exists because of the turning violations would be eliminated by the proposed signal phasing modification.

Other possible modifications in the operation of this traffic signal are related to the traffic patterns in the surrounding area and the traffic signal system that controls certain aspects of the signal timing at the individual intersections. The signal system also oversees the coordination of signal timing between adjacent intersections. An adaptive traffic control system (ATCS) could be implemented in the area to provide better control of fluctuating traffic demands. The desired effect at the Vignes intersection would be a general reduction in bus queuing at the Transit Plaza waiting to exit on to Vignes Street.

Other ways of achieving essentially the same result are to shorten the cycle length and/or to allow "free" operation, with signal timing based solely on input from the detectors right at that location. Another possibility is to leave the intersection under the control of the signal system but make the Plaza exit movement the coordinated phase. As such, the

traffic exiting the Plaza would receive all excess green time once all other phases have been served. Over several cycles, this would tend to reduce queuing in the exit lanes.

Another important consideration is that of maintaining the various pedestrian movements and providing adequate crossing times to ensure pedestrian safety. At present, peak hour pedestrian volumes at this intersection are very light, with the highest volumes around lunch time.

The other signalized location (at the south end of the Transit Plaza) will also be somewhat complex in its operation, due to the variety of movements that can be made and due to the required separation of buses and autos within the Transit Plaza. The existing roadway facilities allow access, for both buses and autos, between the Transit Plaza and the eastbound El Monte Busway roadway. The Busway, at this point, provides an uncontrolled through lane along with separate deceleration and acceleration lanes approaching and departing the Transit Plaza, respectively. Buses make a simple left turn both entering and exiting the Plaza. Automobiles on the other hand must "jog over" in the area of the upper level roadway connector alignment for accessing and departing from the Transit Plaza. Still all of the existing movements, for the volumes of traffic involved, are easily controlled by STOP signs.

The addition of the roadway connector between the Transit Plaza and Union Station (and the subsequent completion of the proposed Ramirez Flyover) will, however, add to the complexity of traffic operations and increase traffic demands to the point that the existing signal equipment will need to be activated. As discussed later, the signal operation is not an issue of providing increased capacity, as the projected traffic volumes will be well below the capacity of the intersection. The primary concerns are the assignment of right-of-way, to minimize conflicts and accident potential, as well as giving priority to the bus movements.

In either the interim case or the eventual completion of the Ramirez Flyover, the signal operation is essentially the same. As shown in Figure 14, there are four basic signal phases. The first phase sequence allows the left turn off of the Busway and the exiting of buses from the Plaza where they can turn either way on the upper level roadway (if available), or left to proceed eastbound on the El Monte Busway. A non-conflicting right turn could also be made by autos exiting the plaza (west intersection) and continuing to Union Station. When the Flyover is in operation, automobiles could also make the right turn movement to enter the Transit Plaza (at the east intersection).

In the second phase sequence, the primary movements are the exiting movements, right and left turns at the west intersection, and the eastbound upper level roadway connector movements, for autos turning left into the Plaza, and for left-turns onto the eastbound busway facility. Concurrent non-conflicting movements include the bus movements turning right out of the east plaza roadway and turning right into the plaza the west intersection.

The third phase sequence involves a continuation of the eastbound movements at the east intersection along with the same movements (left, for buses, and through) on the upper level roadway connector at the west intersection. Non-conflicting movements during this phase include both the auto and bus exiting right turns at the east and west intersections, respectively.

The final phase sequence continues the eastbound through and left-turn (onto the Busway) movements but terminates the left turns into the Transit Plaza so that the pedestrian movements along the north legs of both intersections can occur. Paralleling westbound vehicular movement, particularly when the Ramirez Flyover is completed, would also occur during this phase, with the westbound right-turn movements into the Transit Plaza having to yield right-of-way to pedestrians, when present.

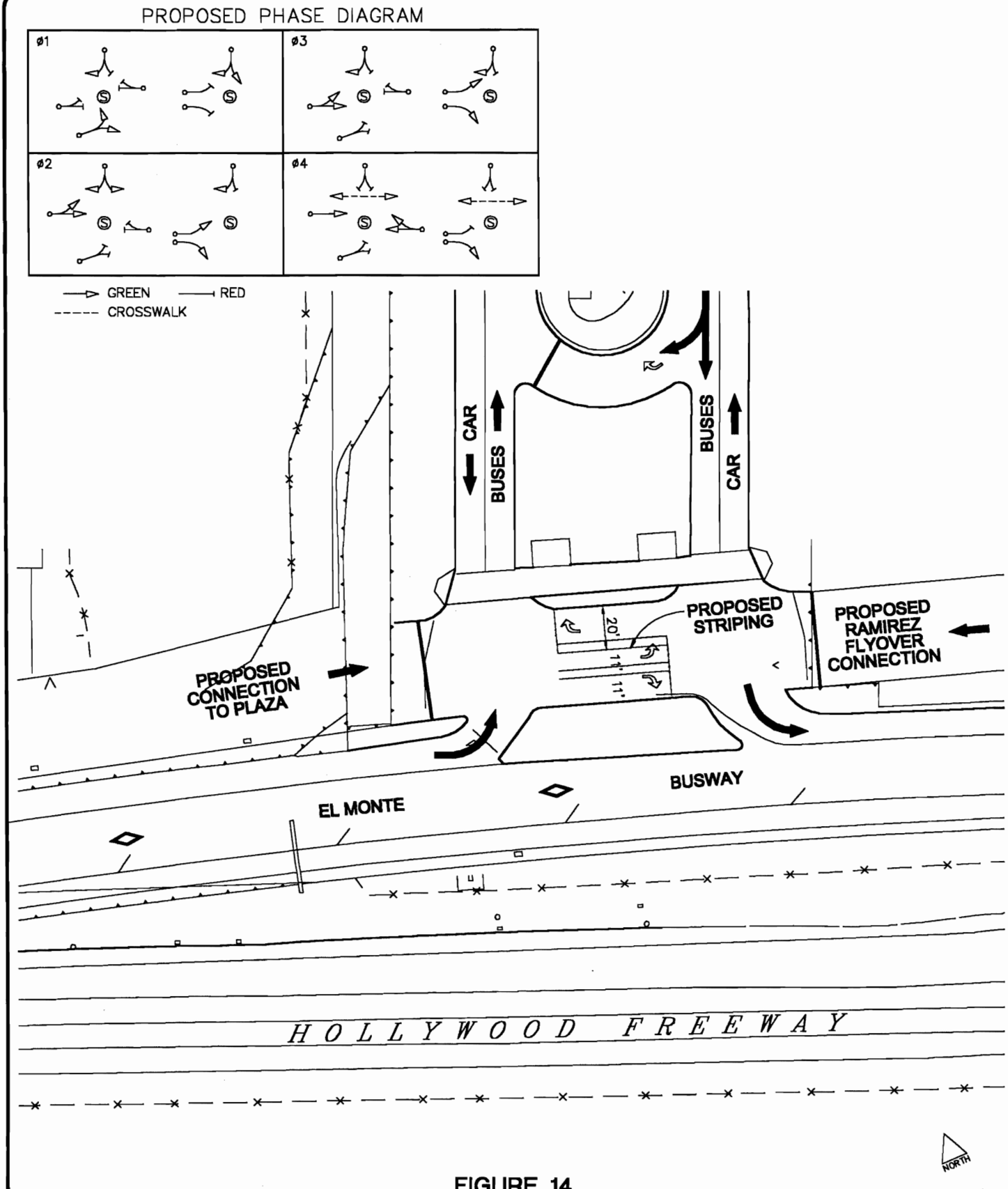

FIGURE 14

6/7/1999

:FN UNIONSTN\BUSWAYSGL

PROPOSED SIGNAL PHASING AT UPPER LEVEL ROADWAY/PLAZA/EL MONTE BUSWAY INTERFACE (WITHOUT RAMIREZ FLYOVER)

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Proposed Striping Along the Upper Level Roadway

The Upper Level Roadway connector roadway is designed to provide a roadway width of 42 feet curb-to-curb. This width allows for a number of possibilities in the geometric design of the striping and lane designations. A primary objective in developing the striping plan is, along with appropriate signing, providing a layout that is easily understood and accomplishes the task of getting the motorists where they want to go with a minimum of confusion. The primary confusion in adding vehicular traffic to the Transit Plaza is that automobile traffic and bus traffic have two different paths of travel. The buses circulate clockwise around the Plaza while autos are intended to circulate counter-clockwise. Thus, a learning period must be anticipated. The motorists must learn not to just follow the bus in front of him or her, and they must become familiar with the various conflict points where bus and auto paths cross where additional traffic control measures such as STOP signs or traffic signals are typically required. Mainly, these conflict points are at the main entrance/exit to the Plaza off of Vignes Street, and at the entrance/exit to the Transit Plaza from the Upper Level Roadway and the El Monte Busway at the south end of the Transit Plaza.

The Plaza predefines the lane configurations within the Plaza and at the entrance and exit points, although there is always the possibility that changes can be made to improve compliance and/or operations (i.e., increase in capacity). The use or addition of standardized traffic control signing in the Plaza, for example, might aid understanding and compliance. The activation of the signal at the intersection of the Plaza roadways with the Upper Level Roadway connection can be helpful in achieving this object when complementary striping and signing are also provided.

The existing 42-foot width of the Upper Level Roadway connector permits one travel lane in each direction plus various turn lanes on the various approaches. On a preliminary

basis, the portion of roadway (connector) between the two Plaza roadways should retain the existing striping (which would also permit right turns) in both directions, along with the eastbound left-turn lane, allowing autos to enter the east side of the Transit Plaza. A suggested change is to reduce the width of the existing eastbound right and left-turn lanes to 11 feet, and install an 11-foot left-turn lane, as shown in red on Figure 14 previously. This would provide a 20-foot lane in the westbound direction. The wide westbound right turn lane is needed to provide room for turning movements from buses. The additional width in the westbound lane would also be beneficial when maintenance in the Plaza requires the closure of the roadway segment where the buses make the turn around from southbound to northbound. They are then detoured to the connector roadway to turn around. When this occurs at present the turning buses intrude into the eastbound left-turn lane, and the proposed added width help this situation. Traditional signage and custom signage tailored to bus/car movements should also be placed at this intersection, which will ease understanding and improve efficiency of traffic movements.

On the west leg approaching the Plaza intersections from Union Station, it is proposed that a bus-only left-turn lane be provided in the median between the opposing through lanes. This would be a continuation of the interior left-turn lane between the Plaza roadways, however, it would be designated "for-buses-only". This is similar to the eastbound left-turn lane on First Street at Spring Street where buses are allowed to turn into the contra-flow bus lane on Spring Street. Diagonal hatching might be added to emphasize that this lane should be not be used for automobile traffic. Overhead signs could also be used to provide better understanding and compliance.

On the east leg of the Ramirez connector roadway, once constructed, it is proposed that a westbound right-turn lane be provided, again to emphasize that autos should turn at the easterly intersection, although the demand for this movement is expected to be

minimal in helping the motorists to understand that auto and bus traffic are routed differently within the Transit Plaza.

In conclusion, the use of the Gateway Transit Plaza in route, to or from the Union Station area, can be designed to operate safely and conveniently with a minimal impact on bus traffic ([redacted]). There may, however, be some confusion by motorists using it for the first few times. For the most part, these will be commuters who will continue to use it on a routine basis. Thus, after an initial learning period, the problems should be minimal. Then, only minimal enforcement should be necessary to ensure compliance and to resolve other problems that might occur over time.

THAT IS THE PURPOSE OF THE PLAZA

Analysis of Proposed Operational Improvements

For reasons of both enhanced bus operations and traffic safety, it is recommended that two operational changes be made in the future as new buildings are constructed. Both of these improvements would affect the Gateway Transit Plaza exit ramp where it comes into the intersection with Vignes Street, Ramirez Street and the Santa Ana (101) Freeway ramps. First, the through movement from the ramp proceeding across the intersection to Ramirez Street should be made from the right lane along with the existing right-turn movement. Second, a change in signal operation should be made to split the movement out of the garage from that coming down the adjacent ramp from the Plaza. These improvements were discussed in more detail previously in this report, but a further analysis should be done to determine the merits of these improvements, or at least to determine that other operational problems will not occur unexpectedly.

This analysis will use the previous set of traffic conditions expected with the opening of the Upper Level roadway connection as the baseline scenario, however, the change to unrestricted movements out of the Gateway Plaza parking garage, instead of the left-turn-only movement that is now required, will attract more traffic to this garage exit.

In this case, it has been assumed that the traffic into and out of the garage, with the proposed changes, will double over that which currently exists. Furthermore, it is obvious that this traffic will be distributed differently. For purposes of this study, it was assumed that 40 percent of the traffic could arrive and depart via freeways to the east. Forty percent of traffic was also assumed on freeway routes to the west. The remaining 20 percent of traffic was assumed to use Vignes Street, with the majority of that traffic utilizing Cesar E. Chavez Avenue to the east and to the west.

The revised traffic assignments which incorporate the above change, are shown in Figures 15, 16 and 17, for the AM peak hour, the Midday traffic period, and the PM peak hour, respectively. The results of the revised CMA calculations for these three cases are summarized in Table 8 below.

Table 8
Critical Movement Analysis Summary
For Proposed Signal and Lane Modifications

Intersection	AM Peak Hour		Midday Period		PM Peak Hour	
	CMA	LOS	CMA	LOS	CMA	LOS
Vignes St./Ramirez St.	0.235	A	0.255	A	0.298	A
Vignes St./Cesar Chavez Ave.	0.606	B	0.373	A	0.578	A

The increased traffic volumes combined with the proposed operational changes cause a slight decrease in CMA values at the intersection of Vignes Street and Ramirez Street. However, these substantial operational and safety benefits cause an increase in operational efficiency at this intersection. The results in Table 8 also indicate that the intersection of Vignes Street and Cesar E. Chavez Avenue will not be impacted by the connection and proposed operational and safety improvements at the adjacent intersection.

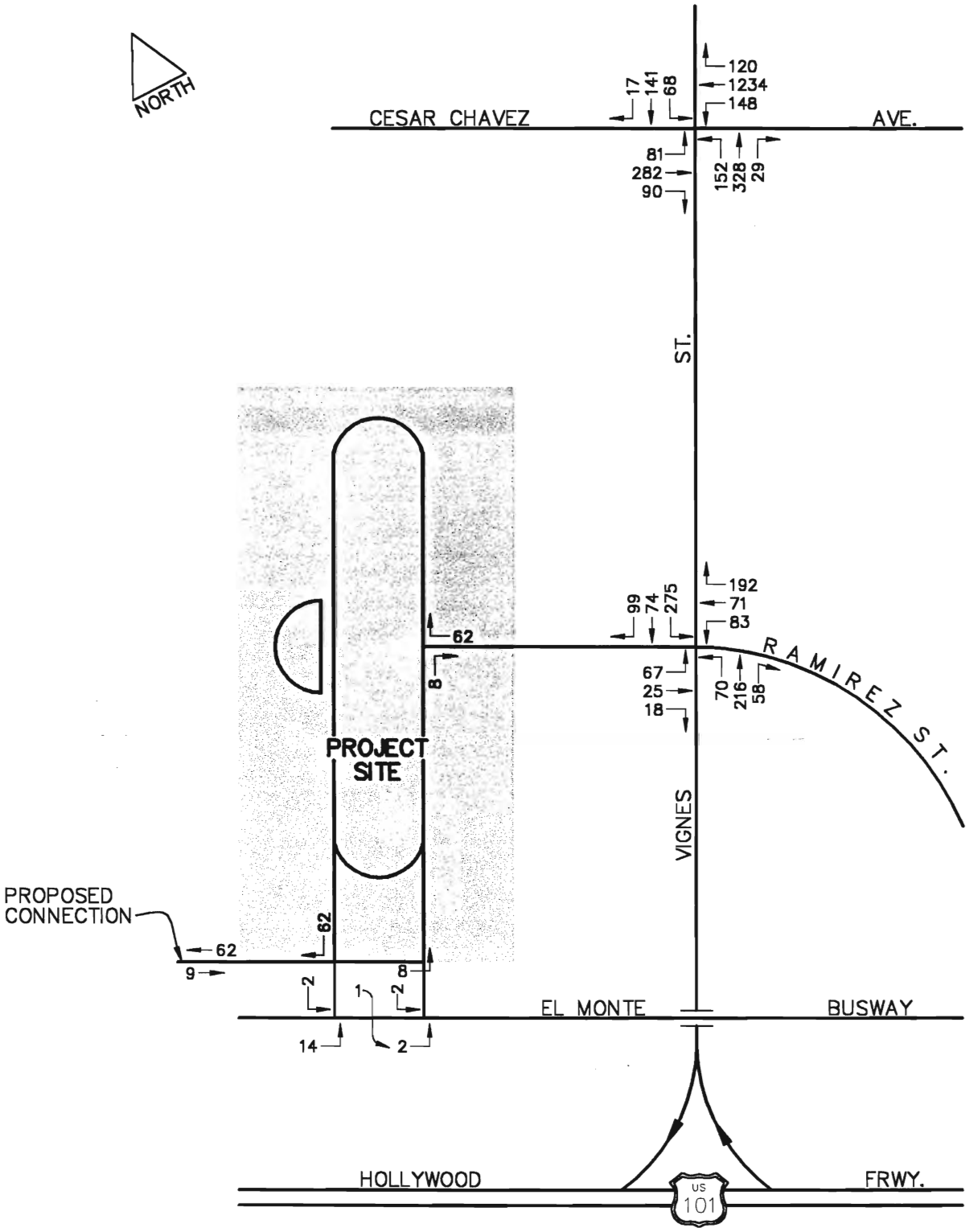

FIGURE 15

6/7/99

FN: UNIONSTN\AMSIGMOD

PROJECTED (1999) TRAFFIC VOLUMES
WITH CONNECTOR AND SIGNAL/LANE MODIFICATIONS
AM PEAK HOUR

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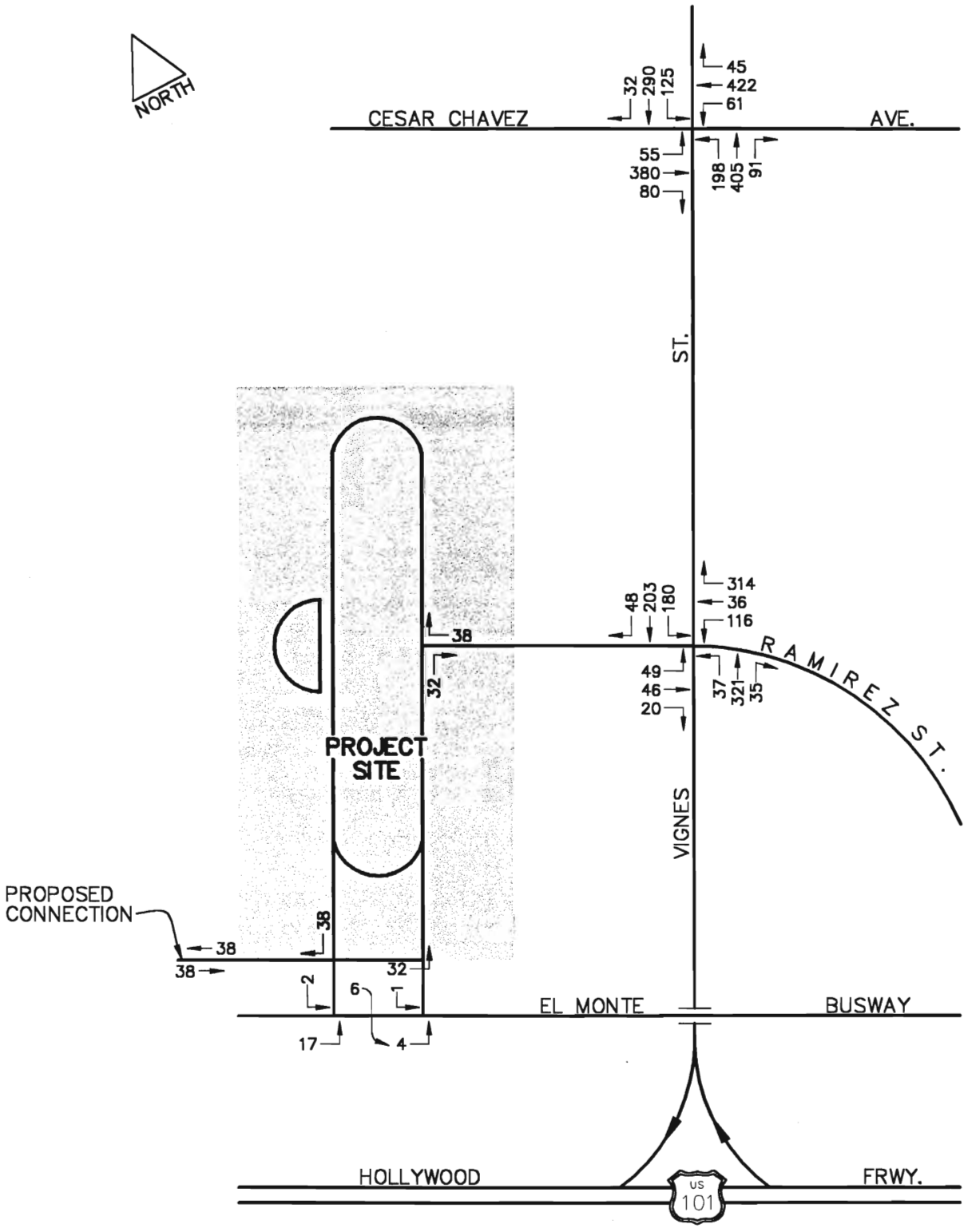

FIGURE 16

6/7/99

FN: UNIONSTN\MIDSIGMD

PROJECTED (1999) TRAFFIC VOLUMES
WITH CONNECTOR AND SIGNAL/LANE MODIFICATIONS
MIDDAY PEAK HOUR

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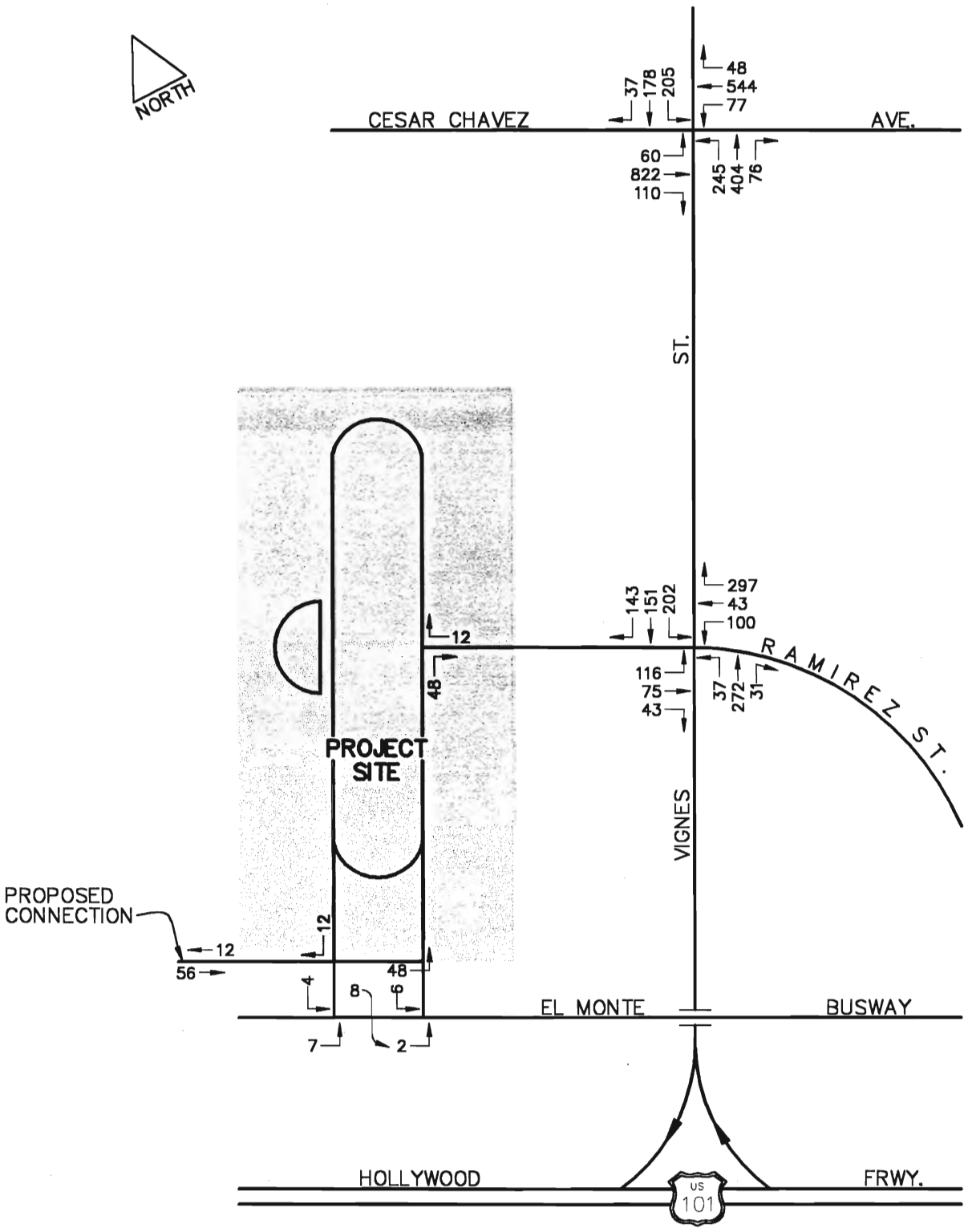

FIGURE 17

6/7/99

FN: UNIONSTN\PMSIGMOD

PROJECTED (1999) TRAFFIC VOLUMES
WITH CONNECTOR AND SIGNAL/LANE MODIFICATIONS
PM PEAK HOUR

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STUDY RESULTS AND CONCLUSIONS

The results and conclusions of this study are that the proposed Upper Level Roadway connection (without completion of the Ramirez Flyover) will not cause significant adverse traffic impacts on bus operations within and adjacent to the Gateway Transit Plaza. Additionally, it is recommended that signal modifications and a redefinition of lane assignments be implemented for the exit ramp coming out of the Plaza into the Vignes/Ramirez intersection. With these improvements, the bus/auto conflicts will be diminished and overall queueing in the two exit lanes should be more equitable.

A final conclusion is that the Ramirez Flyover would go well beyond the benefits discussed above, not only by redirecting substantial volumes of traffic from other more congested areas around Union Station, but also by reducing overall bus traffic in the Gateway Transit Plaza. The Ramirez Flyover is truly a relief valve both for increased traffic growth in and around Union Station, and for some of the existing and potential worse problems that in the future may plague bus operations in and around the Gateway Transit Plaza.

APPENDIX

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, Vignes/Ramirez/Plaza Ramp
DATE: 05-14-1999 INITIALS: VRP PERIOD: AM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	83	25	116	76
EASTBOUND	69	15	0	12
NORTHBOUND	16	216	16	42
SOUTHBOUND	275	74	92	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	83	N/A	N/A	70	70	N/A
EASTBOUND	6	78	N/A	N/A	0	N/A
NORTHBOUND	11	N/A	108	N/A	16	N/A
SOUTHBOUND	151	N/A	74	N/A	92	N/A

EAST-WEST CRITICAL VOLUMES 161
NORTH-SOUTH CRITICAL VOLUMES 259

THE SUM OF CRITICAL VOLUMES 420

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.235

LEVEL OF SERVICE ..... A

---

* Includes CMA value decreased due to ATSAC Implementation.
Eastbound and Westbound approaches have opposed signal phases.

K:\ICAP5\GATEWAY\RAMP1 RR1
05-14-1999, 11:12 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, Vignes/Ramirez/Plaza Ramp
DATE: 05-14-1999 INITIALS: VRP PERIOD: MIDDAY PEAK HR
CASE: EXISTING (1999) BASELINE DATA

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	116	12	215	99
EASTBOUND	51	12	0	6
NORTHBOUND	4	321	0	35
SOUTHBOUND	180	203	44	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	116	N/A	N/A	114	114	N/A
EASTBOUND	14	49	N/A	N/A	0	N/A
NORTHBOUND	4	N/A	160	N/A	0	N/A
SOUTHBOUND	99	N/A	124	124	N/A	N/A

EAST-WEST CRITICAL VOLUMES 165
NORTH-SOUTH CRITICAL VOLUMES 259
THE SUM OF CRITICAL VOLUMES 424

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.238

LEVEL OF SERVICE ..... A

---

* Includes CMA value decreased due to ATSAC Implementation. Eastbound and Westbound approaches have opposed signal phases.

K:\ICAP5\GATEWAY\RAMP1A RR1
05-14-1999, 11:37 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, Vignes/Ramirez/Plaza Ramp
DATE: 05-14-1999 INITIALS: VRP PERIOD: PM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	100	33	186	111
EASTBOUND	122	20	0	17
NORTHBOUND	6	272	0	31
SOUTHBOUND	202	151	133	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	100	N/A	N/A	110	110	N/A
EASTBOUND	27	115	N/A	N/A	0	N/A
NORTHBOUND	6	N/A	136	N/A	0	N/A
SOUTHBOUND	111	N/A	142	142	N/A	N/A

EAST-WEST CRITICAL VOLUMES 225
NORTH-SOUTH CRITICAL VOLUMES 247
THE SUM OF CRITICAL VOLUMES 472

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.273

LEVEL OF SERVICE ..... A

---

* Includes CMA value decreased due to ATSAC Implementation. Eastbound and Westbound approaches have opposed signal phases.

K:\ICAP5\GATEWAY\RAMP1 RR5
05-14-1999, 11:12 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, Vignes/Ramirez/Plaza Ramp
DATE: 05-14-1999 INITIALS: VRP PERIOD: AM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS WITH CONNECTION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	83	44	116	76
EASTBOUND	71	20	0	13
NORTHBOUND	47	216	16	42
SOUTHBOUND	275	74	104	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	83	N/A	N/A	80	80	N/A
EASTBOUND	6	85	N/A	N/A	0	N/A
NORTHBOUND	36	N/A	108	N/A	16	N/A
SOUTHBOUND	151	N/A	74	N/A	104	N/A

EAST-WEST CRITICAL VOLUMES 168
NORTH-SOUTH CRITICAL VOLUMES 259
THE SUM OF CRITICAL VOLUMES 427

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.241

LEVEL OF SERVICE ..... A

---

* Includes CMA value decreased due to ATSAC Implementation. Eastbound and Westbound approaches have opposed signal phases.

K:\ICAP5\GATEWAY\RAMP2 RR2
05-14-1999, 11:54 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, Vignes/Ramirez/Plaza Ramp
DATE: 05-14-1999 INITIALS: VRP PERIOD: MIDDAY PEAK HR
CASE: EXISTING (1999) BASELINE DATA W/CONNECTION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	116	23	215	99
EASTBOUND	57	35	0	9
NORTHBOUND	23	321	0	35
SOUTHBOUND	180	203	52	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	116	N/A	N/A	119	119	N/A
EASTBOUND	14	78	N/A	N/A	0	N/A
NORTHBOUND	19	N/A	160	N/A	0	N/A
SOUTHBOUND	99	N/A	128	128	N/A	N/A

EAST-WEST CRITICAL VOLUMES 197
NORTH-SOUTH CRITICAL VOLUMES 259

THE SUM OF CRITICAL VOLUMES 456

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.262

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation. Eastbound and Westbound approaches have opposed signal phases.

K:\ICAP5\GATEWAY\RAMP1A RR2
05-14-1999, 11:37 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, Vignes/Ramirez/Plaza Ramp
DATE: 05-14-1999 INITIALS: VRP PERIOD: PM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS WITH CONNECTION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	100	37	186	111
EASTBOUND	132	53	0	22
NORTHBOUND	12	272	0	31
SOUTHBOUND	202	151	135	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
EASTBOUND	1	1	0	0	1	0	3
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	100	N/A	N/A	112	112	N/A
EASTBOUND	27	158	N/A	N/A	0	N/A
NORTHBOUND	6	N/A	136	N/A	0	N/A
SOUTHBOUND	111	N/A	143	143	N/A	N/A

EAST-WEST CRITICAL VOLUMES 270
NORTH-SOUTH CRITICAL VOLUMES 247

THE SUM OF CRITICAL VOLUMES 517

NUMBER OF CRITICAL CLEARANCE INTERVALS 4*

CMA VALUE 0.306

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation. Eastbound and Westbound approaches have opposed signal phases.

K:\ICAP5\GATEWAY\RAMP2 RR6
05-14-1999, 11:54 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, VIGNES/RAMIREZ/PLAZA RAMP
DATE: 05-14-1999 INITIALS: VRP PERIOD: AM PEAK HOUR
CASE: EXISTING (1999) BASE(CONNCTR+SIGNAL/LANE MOD SCEN)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	83	71	41	151
E/B GARAGE	2	5	5	0
E/B RAMP	65	20	13	0
NORTHBOUND	70	216	16	42
SOUTHBOUND	275	74	87	12

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
E/B GARAGE	0	0	0	0	0	1	1
E/B RAMP	1	0	0	1	0	0	2
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	83	N/A	71	N/A	41	N/A
E/B GARAGE	N/A	N/A	N/A	N/A	N/A	12
E/B RAMP	65	N/A	N/A	33	N/A	N/A
NORTHBOUND	36	N/A	108	N/A	16	N/A
SOUTHBOUND	151	N/A	74	N/A	87	N/A

EAST-WEST CRITICAL VOLUMES 160
NORTH-SOUTH CRITICAL VOLUMES 259

THE SUM OF CRITICAL VOLUMES 419

NUMBER OF CRITICAL CLEARANCE INTERVALS 4

CMA VALUE 0.235

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation. Eastbound ramp has exclusive phase.

K:\ICAP5\GATEWAY\RAMP4 RR2
05-14-1999, 10:18 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, VIGNES/RAMIREZ/PLAZA RAMP
DATE: 05-14-1999 INITIALS: VRP PERIOD: MIDDAY PEAK HR
CASE: EXISTING (1999) BASE W/ CONNECTOR+SIGNAL/LANE MOD.

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	RIGHT TURNS MAX ON RED **
WESTBOUND	116	36	215	99
E/B GARAGE	6	11	11	0
E/B RAMP	43	35	9	0
NORTHBOUND	37	321	0	35
SOUTHBOUND	180	203	48	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
E/B GARAGE	0	0	0	0	0	1	1
E/B RAMP	1	0	0	1	0	0	2
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	116	N/A	N/A	126	126	N/A
E/B GARAGE	N/A	N/A	N/A	N/A	N/A	28
E/B RAMP	43	N/A	N/A	44	N/A	N/A
NORTHBOUND	19	N/A	160	N/A	0	N/A
SOUTHBOUND	99	N/A	126	126	N/A	N/A

EAST-WEST CRITICAL VOLUMES 188
NORTH-SOUTH CRITICAL VOLUMES 259

THE SUM OF CRITICAL VOLUMES 447

NUMBER OF CRITICAL CLEARANCE INTERVALS 4

CMA VALUE 0.255

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation. Eastbound Ramp has exclusive phase.

K:\ICAP5\GATEWAY\RAMP3A RR1
05-14-1999, 9:36 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, VIGNES/RAMIREZ/PLAZA RAMP
DATE: 05-14-1999 INITIALS: VRP PERIOD: PM PEAK HOUR
CASE: EXISTING (1999) BASE(CONNCTR+SIGNAL/LANE MOD SCEN)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	100	43	186	111
E/B GARAGE	11	22	21	0
E/B RAMP	105	53	22	0
NORTHBOUND	37	272	0	31
SOUTHBOUND	202	151	143	0

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	0	1	1	0	3
E/B GARAGE	0	0	0	0	0	1	1
E/B RAMP	1	0	0	1	0	0	2
NORTHBOUND	2	0	2	0	1	0	5
SOUTHBOUND	2	0	1	1	0	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	100	N/A	N/A	114	114	N/A
E/B GARAGE	N/A	N/A	N/A	N/A	N/A	54
E/B RAMP	105	N/A	N/A	75	N/A	N/A
NORTHBOUND	31	N/A	136	N/A	0	N/A
SOUTHBOUND	111	N/A	147	147	N/A	N/A

EAST-WEST CRITICAL VOLUMES 259
NORTH-SOUTH CRITICAL VOLUMES 247

THE SUM OF CRITICAL VOLUMES 506

NUMBER OF CRITICAL CLEARANCE INTERVALS 4

CMA VALUE 0.298

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation. Eastbound ramp has exclusive phase.

K:\ICAP5\GATEWAY\RAMP4 RR6
05-14-1999, 10:18 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: AM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	140	1234	52	68
EASTBOUND	81	282	0	87
NORTHBOUND	151	326	0	32
SOUTHBOUND	68	139	0	17

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	140	N/A	617	N/A	52	N/A
EASTBOUND	81	N/A	141	N/A	0	N/A
NORTHBOUND	151	N/A	163	N/A	0	N/A
SOUTHBOUND	68	N/A	70	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES	698
NORTH-SOUTH CRITICAL VOLUMES	231
THE SUM OF CRITICAL VOLUMES	929
NUMBER OF CRITICAL CLEARANCE INTERVALS	4
CMA VALUE	0.606
LEVEL OF SERVICE	B

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP1 RR1
05-14-1999, 11:12 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: MIDDAY PEAK HR
CASE: EXISTING (1999) BASELINE DATA

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	56	422	0	45
EASTBOUND	55	380	0	82
NORTHBOUND	202	406	32	56
SOUTHBOUND	125	289	0	32

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	56	N/A	211	N/A	0	N/A
EASTBOUND	55	N/A	190	N/A	0	N/A
NORTHBOUND	202	N/A	203	N/A	32	N/A
SOUTHBOUND	125	N/A	144	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES 266
NORTH-SOUTH CRITICAL VOLUMES 346

THE SUM OF CRITICAL VOLUMES 612

NUMBER OF CRITICAL CLEARANCE INTERVALS 4

CMA VALUE 0.375

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP1A RR1
05-14-1999, 11:37 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: PM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS **	
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	74	544	0	48
EASTBOUND	60	822	0	106
NORTHBOUND	245	397	7	74
SOUTHBOUND	205	175	0	37

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	74	N/A	272	N/A	0	N/A
EASTBOUND	60	N/A	411	N/A	0	N/A
NORTHBOUND	245	N/A	198	N/A	7	N/A
SOUTHBOUND	205	N/A	88	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES 485
NORTH-SOUTH CRITICAL VOLUMES 403

THE SUM OF CRITICAL VOLUMES 888

NUMBER OF CRITICAL CLEARANCE INTERVALS 4

CMA VALUE 0.576

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP1 RR5
05-14-1999, 11:12 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: AM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS WITH CONNECTION

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS	**
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	149	1234	52	68
EASTBOUND	81	282	0	87
NORTHBOUND	152	327	0	32
SOUTHBOUND	68	142	0	17

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	149	N/A	617	N/A	52	N/A
EASTBOUND	81	N/A	141	N/A	0	N/A
NORTHBOUND	152	N/A	164	N/A	0	N/A
SOUTHBOUND	68	N/A	71	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES	698
NORTH-SOUTH CRITICAL VOLUMES	232
THE SUM OF CRITICAL VOLUMES	930
NUMBER OF CRITICAL CLEARANCE INTERVALS	4
CMA VALUE	0.606
LEVEL OF SERVICE	B

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP2 RR2
05-14-1999, 11:54 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: MIDDAY PEAK HR
CASE: EXISTING (1999) BASELINE DATA WITH CONNECTOR

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	62	422	0	45
EASTBOUND	55	380	0	82
NORTHBOUND	202	407	31	62
SOUTHBOUND	125	291	0	32

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	62	N/A	211	N/A	0	N/A
EASTBOUND	55	N/A	190	N/A	0	N/A
NORTHBOUND	202	N/A	204	N/A	31	N/A
SOUTHBOUND	125	N/A	146	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES	266
NORTH-SOUTH CRITICAL VOLUMES	348
THE SUM OF CRITICAL VOLUMES	614
NUMBER OF CRITICAL CLEARANCE INTERVALS	4
CMA VALUE	0.377
LEVEL OF SERVICE	A

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP1A RR2
05-14-1999, 11:37 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: PM PEAK HOUR
CASE: EXISTING (1999) BASE CONDITIONS WITH CONNECTION

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS ** MIN ON GREEN	MAX ON RED
WESTBOUND	75	544	0	48
EASTBOUND	60	822	0	106
NORTHBOUND	245	400	13	75
SOUTHBOUND	205	176	0	37

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	75	N/A	272	N/A	0	N/A
EASTBOUND	60	N/A	411	N/A	0	N/A
NORTHBOUND	245	N/A	200	N/A	13	N/A
SOUTHBOUND	205	N/A	88	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES	486
NORTH-SOUTH CRITICAL VOLUMES	405
THE SUM OF CRITICAL VOLUMES	891
NUMBER OF CRITICAL CLEARANCE INTERVALS	4
CMA VALUE	0.578
LEVEL OF SERVICE	A

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP2 RR6
05-14-1999, 11:54 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: AM PEAK HOUR
CASE: EXISTING (1999) BASE(CONNCTR+SIGNAL/LANE MOD SCEN)

** INPUT VOLUMES **

APPROACH			** RIGHT TURNS **	
	LEFT	THROUGH	MIN ON GREEN	MAX ON RED
WESTBOUND	148	1234	52	68
EASTBOUND	81	282	0	84
NORTHBOUND	152	326	0	29
SOUTHBOUND	68	141	0	17

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	148	N/A	617	N/A	52	N/A
EASTBOUND	81	N/A	141	N/A	0	N/A
NORTHBOUND	152	N/A	163	N/A	0	N/A
SOUTHBOUND	68	N/A	70	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES	698
NORTH-SOUTH CRITICAL VOLUMES	231
THE SUM OF CRITICAL VOLUMES	929
NUMBER OF CRITICAL CLEARANCE INTERVALS	4
CMA VALUE	0.606
LEVEL OF SERVICE	B

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP4 RR2
05-14-1999, 10:18 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 1, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: MIDDAY PEAK HR
CASE: EXISTING (1999) BASE W/ CONNECTOR+SIGNAL/LANE MOD.

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	61	422	0	45
EASTBOUND	55	380	0	80
NORTHBOUND	198	405	30	61
SOUTHBOUND	125	290	0	32

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	61	N/A	211	N/A	0	N/A
EASTBOUND	55	N/A	190	N/A	0	N/A
NORTHBOUND	198	N/A	202	N/A	30	N/A
SOUTHBOUND	125	N/A	145	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES 266
NORTH-SOUTH CRITICAL VOLUMES 343

THE SUM OF CRITICAL VOLUMES 609

NUMBER OF CRITICAL CLEARANCE INTERVALS 4

CMA VALUE 0.373

LEVEL OF SERVICE ..... A

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP3A RR1
05-14-1999, 9:36 AM

CRAIN AND ASSOCIATES
CMA CALCULATIONS

INTERSECTION: 2, CESAR CHAVEZ/VIGNES
DATE: 05-14-1999 INITIALS: VRP PERIOD: PM PEAK HOUR
CASE: EXISTING (1999) BASE(CONNCTR+SIGNAL/LANE MOD SCEN)

** INPUT VOLUMES **

APPROACH	LEFT	THROUGH	** RIGHT TURNS MIN ON GREEN	MAX ON RED **
WESTBOUND	77	544	0	48
EASTBOUND	60	822	0	110
NORTHBOUND	245	396	0	76
SOUTHBOUND	205	178	0	37

** NUMBER OF LANES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED	TOTAL LANES
WESTBOUND	1	0	2	0	1	0	4
EASTBOUND	1	0	2	0	1	0	4
NORTHBOUND	1	0	2	0	1	0	4
SOUTHBOUND	1	0	2	0	1	0	4

** ASSIGNED LANE VOLUMES **

APPROACH	LEFT ONLY	LEFT SHARED	THROUGH ONLY	RIGHT SHARED	RIGHT ONLY	L/T/R SHARED
WESTBOUND	77	N/A	272	N/A	0	N/A
EASTBOUND	60	N/A	411	N/A	0	N/A
NORTHBOUND	245	N/A	198	N/A	0	N/A
SOUTHBOUND	205	N/A	89	N/A	0	N/A

EAST-WEST CRITICAL VOLUMES	488
NORTH-SOUTH CRITICAL VOLUMES	403
THE SUM OF CRITICAL VOLUMES	891
NUMBER OF CRITICAL CLEARANCE INTERVALS	4
CMA VALUE	0.578
LEVEL OF SERVICE	A

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* Includes CMA value decreased due to ATSAC Implementation.

K:\ICAP5\GATEWAY\RAMP4 RR6
05-14-1999, 10:18 AM