locations with the minimum number of accidents at intersections (three) or mid-block (two) locations will be limited.

A summary table should be prepared to reflect the following information:

1. Total number of accidents by type, i.e. left-turn, rear-end, etc.;
2. Total number of accidents by severity, i.e. property damage only, injury and fatal; and
3. Total number of accidents by intersection approach or, for mid-block locations, direction of travel.

The summary table should be updated quarterly throughout the calendar year. It should be filed together with the location's cumulative accident record, collision diagram and accident reports.

Supplement accident data with field observations during peak traffic and/or peak accident hours.

Based upon accident data already compiled, the Engineer should determine if it truly appears (1) an accident problem does exist; and (2) a solution can be logically developed based upon the number and type of accidents which have occurred. If such a determination is made, field surveys, traffic counts and detailed review of individual accident reports are the next steps in the analysis. Because a certain number of accidents are inevitable regardless of the engineering, enforcement and education programs in effect, it may be that the accident experience is quite normal in spite of the fact that the location's number of accidents exceeds the minimum set forth herein (recall that the minimum only serve as a basis for further study--not as standards of hazardous operation). Also, unless a pattern of accident type is established, it is very difficult to establish a basis for remedial measures. (Five different collision types distributed throughout all intersection approaches clearly does not establish an adequate basis for recommendation). If, however, a collision diagram(s) indicates an accident pattern/problem, a field survey should be conducted by qualified City Staff.

The best insight into any accident situation can be gained from a visit to the scene. Observing actual traffic movements during the hours when highest numbers of collisions have occurred is considered particularly valuable in any accident analysis. The collision diagram and accident summary should be used as reference during the field visit to make on the spot determinations of probable remedies.

These questions should be considered during the field study:

1. Are the accidents caused by physical conditions of the road or adjacent property and can the conditions be eliminated or corrected?

2. Does overall congestion or delay result in vehicle conflicts or improper motorist behavior?

3. Are the existing signs, signals, and pavement markings doing the job for which they are intended? Is it possible they are, in any way, contributing causes of accidents rather than preventing them?

4. Is traffic properly channelized to minimize the occurrence of accidents?

5. Would accidents be prevented by the prohibition of any single traffic movement, such as a minor left turn movement?

6. Can part of the traffic be diverted to other thoroughfares where the accident potential is not as great?

7. Are night accidents out of proportion to daytime accidents, based on traffic volume, indicating need for special night time protection, such as street lighting, signal control or reflectorized signs or markings.

8. Do conditions show that additional traffic laws or selective enforcement are required?

9. Is there a need for supplemental studies of traffic movement, such as driver observance of existing control devices, speed studies of vehicles approaching the accident location and others?

10. Is parking in the area contributing to accidents. If so, perhaps reduction of the width of approach lanes or sight obstructions in advance of the intersection resulting from the parking are causing the accident.

11. Are there adequate advance warning signs of route changes so that the proper lanes may be chosen by approaching motorists well in advance of the area, thus minimizing the need for lane changing near the accident location?

Analyze the summary facts and field data to prepare a remedial program per study location.

Engineering remedial measures can be developed based upon field observations and data and the accident patterns illustrated in the collision diagrams. Table 6 contains potential solutions that have proven to be effective in reducing specific types of accidents. For each type of accident listed in the left hand column, potential corrective measures are shown for intersection and mid-block locations. The selection of one or more of these measures should be predicated upon both feasibility or implementation and effectiveness in increasing operational safety.

Finally, assuming remedial measures can be implemented, it is recommended that "before and after" studies be conducted. Based upon at least a 12 month accident history a comparison of pre-improvement accident records with post-improvement accident records should be made.

**Evaluation**

The continuing accident surveillance program will enable the City of Lafayette to make continuous checks on traffic accident problems along Moraga Road. The aim of the traffic safety program is obviously to reduce the frequency and severity of traffic accidents on a city wide basis. These continuing programs will allow the City to monitor its progress in this effort.

As each piece of the program is implemented, the City should take steps that will enable it to evaluate that portion of the program. Each intersection, for example, should be the subject of "before and after" accident analyses to see if the improvement has resulted in the expected accident reduction.

## Right Angle and Rear-End Collisions at Intersections

1. Removal of view obstructions, such as foliage, bushes, billboards, or parking at curb
2. Installation of warning signs, if speeds are high and the element of surprise is present
3. Installation of stop signs, if view is obstructed to such an extent that safe approach speed is 8 miles per hour or less, if one street is an approach street, or no other remedy reduces accident frequency
4. Installation of traffic signals if minimum warrants are met
5. Continuing operation of traffic signals during certain light traffic hours when signals are normally off
6. Provision of proper clearance interval in signal cycle
7. Relocation, repair, or other means of providing better visibility of signs or signals
8. Better street lighting
9. Provision of pedestrian cross-walk marking and/or pedestrian barriers
10. Rerouting of through traffic onto specially designated and protected through streets
11. Creation of one-way streets
12. Provision of traffic signal system time for progressive movement
13. Speed zoning to safe approach speed

## Head-On, Left-Turn Collisions at Intersections.

1. Provision of turning guide lines
2. Prohibition of left turns (provided such movement is of little importance)
3. Provision of channelizing islands
4. Provision of protected turning interval, via traffic signal control
5. Installation of STOP signs (provided no other remedy works)
6. Elimination of view obstructions
7. Creation of one-way street
8. Routing of turning traffic via an alternate route (with proper signs) to eliminate left turn

## Pedestrian-Vehicular Collisions at Intersections.

1. Installation of pedestrian cross-walk lines
2. Erection of pedestrian barriers
3. Installation of traffic signals
4. Provision of pedestrian refuge islands
5. Prohibition of curb parking
6. Provision of adequate street lighting
7. Creation of one-way street
8. Rerouting of through traffic to specially designated and protected through streets
9. Addition of pedestrian indications and pedestrian actuation features to existing traffic signals

## Sideswiping Collisions.

1. Installation of painted pavement lane lines
2. Installation of channelizing islands, if at intersections
3. Installation of advance warning signs to warn drivers of proper lane for certain destinations
4. Speed zoning
5. Provision of acceleration or deceleration lanes at intersections
6. Widening of pavement
7. Creation of one-way street
8. Elimination of marginal obstructions such as caused by parked vehicles or other bottlenecks

## Head-On Collisions.

1. Same remedies as for side-swiping collisions
2. Installation of "no-passing" zone at curves or other points with restricted view
3. Installation of center dividing strip

## Vehicles Running off Roadway.

1. Installation of pavement centerline
2. Installation of warning reflectors, guardrail, or white posts at curve
3. Installation of advance warning signs
4. Installation of roadside delineators
5. Speed zoning
6. Street lighting
7. Skid-proofing slippery black top pavement, improving shoulder maintenance, and prompt ice treatment and snow removal

## Collision with Fixed Objects.

1. Application of paint and reflectors to fixed object
2. Use of pavement guide lines to guide traffic around obstruction
3. Street lighting
4. Reduction of the number of fixed objects
   a. Place signs that must be in the median back-to-back wherever possible.

POTENTIAL ENGINEERING REMEDIAL MEASURES

Source: Louis J. Pignataro, Traffic Engineering Theory and Practice, 1973

# APPENDICES

- LEVEL OF SERVICE CONCEPT AND DEFINITIONS
- LEVEL OF SERVICE (LOS) CALCULATIONS
- SIGNAL WARRANT CHARTS
- DAILY TRAFFIC COUNTS

## LEVEL OF SERVICE CONCEPT

### Signalized Intersection

Level of Service (LOS) is the primary indicator for traffic operation performance at intersections. The volume-capacity ratio (v/c) is determined by the volume of conflicting traffic movements per hour and the capacity designed to accommodate them. This ratio, in turn, is rated from LOS "A" to "F." The range describes increasing traffic demand, delays, and deterioration of services.

LOS "A" represents free-flow conditions with little or no delay (zero to five seconds) at intersections. On the contrary, LOS "E" characterizes extremely unstable flow conditions with volumes at or near the designed capacity. Vehicles are likely to experience major delays (40 to 60 seconds) crossing an intersection. Minor incidents may lead to forced flow conditions (LOS "F") with operating volume substantially below capacity. This results in long queues backing up from all approaches to intersections.

LOS ratings from signalized and unsignalized intersections are determined based on different criteria and hence are not directly comparable.

### Two-Way Stop-Sign Controlled Intersection

Level of service to individual turning movements on all approaches are determined by a number of factors. These include merging and opposing volumes, arrival frequency on the minor approach, approach speeds, critical gap, sign control, design capacity and intersection geometry.

The resulting LOS reflects delays experienced by that minor street traffic. Thus, while the overall operating condition of the intersection is stable (LOS "C"), certain turning movements to/from the side street could experience delays equivalent to LOS "E" or "F."

### Four-Way Stop-Sign Controlled Intersection

Vehicle delay is not related to critical gap since stopping is required on all approaches. Instead, interaction of vehicles is complex and depends on the arrival distribution on different approaches, departure headways, design capacity and intersection geometry.

The resulting LOS reflects similar overall delays described for signalized locations. However, if volumes are substantially "unbalanced" between the intersection legs, vehicles on the highest volume approach would experience disproportionate delays.

## LEVEL OF SERVICE DEFINITIONS

| LEVEL OF SERVICE | SIGNALIZED INTERSECTIONS | UNSIGNALIZED INTERSECTIONS |
|---|---|---|
| "A" | Uncongested operations, all queues clear in a single-signal cycle. (Average stopped delay less than 5 seconds per vehicle.) | Little or no delay. |
| "B" | Uncongested operations, all queues clear in a single cycle. (Average delay of 5-15 seconds.) | Short traffic delays. |
| "C" | Light congestion, occasional backups on critical approaches. (Average delay of 15-25 seconds.) | Average traffic delay. |
| "D" | Significant congestion of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. (Average delay of 25-40 seconds.) | Long traffic delays. |
| "E" | Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). (Average delay of 40-60 seconds.) means takes 1 min per car going thru intersection, not length of wait for last guy in line | Very long traffic delays, failure, extreme congestion. |
| "F" | Total breakdown, stop-and-go operation. (Average delay in excess of 60 seconds.) 20 cars - can take 20 min. to get them all thru | Intersection blocked by external causes. |

```
LOCATION:MORAGA RD. / MORAGA BL.         |NAME:EXISTING AM
------------------------------------------------------------------------------
HOURLY VOLUMES                           | VOLUMES IN PCPH
                                    N>   |
  jor street:MORAGA RD.                  |
======================================== | ==================================
N= 2                  <---V5---  550     |                  <---V5---
Grade  1310---V2--->  v---V4---   50     |        ---V2--->   v---V4---  55
  0%     50---V3---v             N= 2    |        ---V3---v
================ <|    |>  ========= | ================= <|    |> =========
Date of Counts: |   |      |   |        |                  |    |    |
12/1/87         |   V7     V9  | X STOP |                  |    V7  V9 |
Time Period:    |   |      |   |  YIELD |                  |    |    |
7:30-8:30 AM    |   20      40|         |                  |    22   44|
Approach Speed:  Minor Street:   Grade  |
35 MPH          MORAGA BL.        0%    |
PHF: 0.85          N= 1
Population: 20879
==============================================================================
VOLUME ADJUSTMENTS
------------------------------------------------------------------------------
Movement no.            |   2   |   3   |   4   |   5   |   7   |   9   |
------------------------------------------------------------------------------
Volume (vph)            |  1310 |    50 |    50 |   550 |    20 |    40 |
------------------------------------------------------------------------------
Vol(pcph),see Table 10.1|XXXXXXX|XXXXXXX|    55 |XXXXXXX|    22 |    44 |
==============================================================================
STEP 1 : RT From Minor Street             |           /-> V9
==============================================================================
   flicting Flows, Vc                     | 1/2 V3+V2= 25 + 655 = 680 vph(Vc9)
   tical Gap, Tc                          | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                    | Cp9=  498 pcph (Fig.10.3)
Actual Capacity, Cm                       | Cm9=Cp9=  498 pcph
==============================================================================
STEP 2 : LT From Major Street             |           v-- V4
==============================================================================
Conflicting Flows, Vc                     | V3+V2= 50 + 1310 = 1360 vph(Vc4)
Critical Gap, Tc                          | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                    | Cp4=  202 pcph (Fig.10.3)
% of Cp utilized and Impedance Factor     | (V4/Cp4)x100= 27.2% P4=  .8
Actual Capacity, Cm          (Fig.10.5)   | Cm4=Cp4=  202 pcph
==============================================================================
STEP 3 : LT From Minor Street             |           <-\ V7
==============================================================================
Conflicting Flows, Vc                     | 1/2 V3+V2+V5+V4=
                                          | 25 + 1310 + 550 + 50 = 1700 vph(Vc7)
Critical Gap, Tc                          | Tc=    7 secs (Tab.10.2)
Potential Capacity, Cp                    | Cp7=   65 pcph (Fig.10.3)
Actual Capacity, Cm                       | Cm7=Cp7xP4= 65 x .8 = 52 pcph
==============================================================================
SHARED LANE CAPACITY    SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared

                                               CR         CR       LOS   LOS
MOVEMENT    V(PCPH)    CM(PCPH)    CSH(PCPH)   (CM-V)    (CSH-V)    CM    CSH
==============================================================================
    7          22         52          129         30        63       E     E
    9          44        498          129        454        63       A     E
    4          55        202                     147                 D
```

```
LOCATION:MORAGA RD. / MORAGA BL.        |NAME:EXISTING PM
-------------------------------------------------------------------------------
HOURLY VOLUMES                          | VOLUMES IN PCPH
                                     N> |
 Major street:MORAGA RD.                |
======================================= | ===================================
N= 2                    <---V5--- 1145 |                    <---V5---
Grade   730---V2--->    v---V4---   60 |         ---V2--->     v---V4---   66
 0%      45---V3---v             N= 2  |         ---V3---v
================  <|     |>  ========= | ================  <|    |>  ========
Date of Counts: |  |     |   |         |               |  |     |  |
12/1/87         |  V7    V9  | X STOP  |               |  V7   V9  |
Time Period:    |  |     |   |  YIELD  |               |  |     |  |
4:30-5:30 PM    |  25    50|           |               |  28    55|
Approach Speed:  Minor Street:   Grade  |
35 MPH          MORAGA BL.       0%    |
PHF: 0.85       N= 1
Population: 20879
===============================================================================
VOLUME ADJUSTMENTS
-------------------------------------------------------------------------------
Movement no.           |   2   |   3   |   4   |   5   |   7   |   9   |
-------------------------------------------------------------------------------
Volume (vph)           |  730  |   45  |   60  |  1145 |   25  |   50  |
-------------------------------------------------------------------------------
Vol(pcph),see Table 10.1|XXXXXXX|XXXXXXX|   66  |XXXXXXX|   28  |   55  |
===============================================================================
STEP 1 : RT From Minor Street           |         /-> V9
===============================================================================
Conflicting Flows, Vc                   | 1/2 V3+V2= 23 + 365 = 388 vph(Vc9)
Critical Gap, Tc                        | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp9=  710 pcph (Fig.10.3)
Actual Capacity, Cm                     | Cm9=Cp9=  710 pcph
===============================================================================
STEP 2 : LT From Major Street           |         v-- V4
===============================================================================
Conflicting Flows, Vc                   | V3+V2= 45 + 730 = 775 vph(Vc4)
Critical Gap, Tc                        | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp4=  440 pcph (Fig.10.3)
% of Cp utilized and Impedance Factor   | (V4/Cp4)x100=  15% P4=  .9
Actual Capacity, Cm          (Fig.10.5) | Cm4=Cp4=  440 pcph
===============================================================================
STEP 3 : LT From Minor Street           |         <-\ V7
===============================================================================
Conflicting Flows, Vc                   | 1/2 V3+V2+V5+V4=
                                        | 23 + 730 + 1145 + 60 = 1700 vph(Vc7)
Critical Gap, Tc                        | Tc=    7 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp7=   65 pcph (Fig.10.3)
Actual Capacity, Cm                     | Cm7=Cp7xP4= 65 x .9 = 59 pcph
===============================================================================
SHARED LANE CAPACITY     SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared

                                                    CR        CR      LOS   LOS
MOVEMENT    V(PCPH)    CM(PCPH)    CSH(PCPH)      (CM-V)   (CSH-V)    CM    CSH
===============================================================================
    7         28          59          150           31        67       E     E
    9         55         710          150          655        67       A     E
    4         66         440                       374                 B
```

Critical Movement Analysis: PLANNING
Calculation Form 1

Intersection: MORAGA RD. / ST. MARY'S                                    Design Hour: 4:30-5:30 PM
Problem Statement: EXISTING PM

```
=======================================================================================================================
Step 1. IDENTIFY LANE GEOMETRY      | Step 4. LEFT TURN CHECK                 | Step 6b. VOLUME ADJUSTMENT FOR        |
             | Approach 3:MORAGA RD. |                   -------Approach-----|          MULTIPHASE SIGNAL OVERLAP    |
             |    1   1 |    ^       |                   : -1-  -2-  -3-  -4-|         Possible   Volume    Adjusted|
             |  R   L   |    N       |a.No. of change    :  0    0    0    0|Prob-  Critical  Carryover  Critical|
             | R T T T L |           | intervals/hour    :                   |able    Volume   to next    Volume |
------------- T H H H T -------------|b.LT capacity on   :  0    0    0    0|Phase   in vph    phase     in vph |
 Approach 1   < < | > >   ^--RT      | change (vph)      :                   |---------------------------------------|
     LT--^     v v v     <^-RTH      |c.G/C ratio        :  0    0    0    0|B1     20(B1)                      20|
     LTH-^>              <--TH       |d.Opposing volume  :  0    0    0  855|A3B4  420(B4)  855- 420= 435(A3)   420|
      TH-->              <v-LTH      | in vph            :                   |A3A4  505(A4) OR  435(A3)          505|
     RTH-v>    ^ ^ ^      v--LT  1   |e.LT capacity on   :  0    0    0    0|                                       |
     RT--v    < < | > >  Approach 2  | green (vph)       :                   |                                       |
------------- L L T R R -------------|f.LT capacity in   :  0    0    0    0|                                       |
             | T T H T T |ST. MARY'S RD| vph (b+e)       :                   |                                       |
             |   H   H   |           |g.Left turn volume :  0    0    0    0|                                       |
             |     1     |           | in vph            :                   |                                       |
             | Approach 4:MORAGA RD. |h.Is volume > cap. : NO             NO|                                       |
                                     | (g>f) ?           :                   |                                       |
=====================================+=======================================+=======================================|
Step 2. IDENTIFY VOLUMES, in vph     | Step 5. ASSIGN LANE VOLUMES, in vph   | Step 7. SUM OF CRITICAL VOLUMES       |
                                     |           |                   |       |                                       |
                                     |           | 8 4               |       |20(B1)+925(B4A4)+0()+0()               |
             | Approach 3|           |-------  5 2             -------|                                       |
3:  LT= 420 | |          | 2:RT=  0  |         5 0             v-  20 |          = 945 vph                    |
   TH= 855 | |           |   TH=  0  |         | |                     |=======================================|
   RT=   0 | v           |   LT= 20  |         v >                     | Step 8. INTERSECTION LEVEL OF         |
-------------            -------------|                                       |          SERVICE                      |
                      <--Approach 2  |                                       |      (compare step 7 with table 6)   |
                                     |                                       |               -------                 |
                                     |                                       |               |  B  |                 |
Approach 1-->                        |                                       |               -------                 |
-------------            -------------|                        ^ >            |=======================================|
1:LT=   0   |          ^ | 4: RT= 20 |                        + +            | Step 9. RECALCULATE                   |
  TH=   0   |          | |    TH= 485|                                       |                                       |
  RT=   0   |          | |    LT=   0|-------                  4    -------|Geometric Change:                      |
             | Approach 4|           |           |             8 2 |       |Signal Change:                         |
                                     |           |             5 0 |       |Volume Change:                         |
=====================================+=======================================+=======================================|
Step 3. IDENTIFY PHASING             | Step 6a. CRITICAL VOLUMES, in vph     | COMMENTS                              |
                                     |          (two phase signal)           |                                       |
        v--     B1                   |             | Approach 3|             |                                       |
                                     |             |           |             |                                       |
      |   |   A3B4                   |             |           |             |                                       |
      v   >                          |             |           |             |                                       |
      |   ^   A3A4                   |-------------             -------------|                                       |
      v   |                          | Approach 1                            |                                       |
                                     |                                       |                                       |
                                     |             See Step 6b.              |                                       |
                                     |                                       |                                       |
                                     |                          Approach 2   |                                       |
                                     |-------------             -------------|                                       |
                                     |             |           |             |                                       |
-------------------------------------|             |           |             |                                       |
 A1 -->    A3 |      B1 v--     B3  <|             |           |             |                                       |
             v ^                   | |             | Approach 4|             |                                       |
 A2 <--    A4 |      B2 --^     B4  |>                                       | V/C Ratio = .66                       |
=======================================================================================================================
```

Critical Movement Analysis: PLANNING
Calculation Form 1

Intersection: MORAGA RD. / ST. MARY'S
Problem Statement: EXISTING AM

Design Hour: 7:30-8:30 AM

## Step 1. IDENTIFY LANE GEOMETRY

```
       | Approach 3:MORAGA RD.  |
       |     1   1  |    ^
       |    R   L   |    N
       | R T T T L  |
-------- T H H H T  ------------
 Approach 1  < < | > >   ^--RT
   LT--^     v v v     <^-RTH
  LTH-^>               <--TH
   TH-->               <v-LTH
  RTH-v>     ^ ^ ^     v--LT  1
   RT--v   < < | > >   Approach 2
--------   L L T R R  ------------
       |  T T H T T  |ST. MARY'S RD
       |    H   H    |
       |        1    |
       | Approach 4:MORAGA RD.
```

## Step 4. LEFT TURN CHECK

| | Approach -1- | -2- | -3- | -4- |
|---|---|---|---|---|
| a. No. of change intervals/hour | 0 | 0 | 0 | 0 |
| b. LT capacity on change (vph) | 0 | 0 | 0 | 0 |
| c. G/C ratio | 0 | 0 | 0 | 0 |
| d. Opposing volume in vph | 0 | 0 | 0 | 480 |
| e. LT capacity on green (vph) | 0 | 0 | 0 | 0 |
| f. LT capacity in vph (b+e) | 0 | 0 | 0 | 0 |
| g. Left turn volume in vph | 0 | 0 | 0 | 0 |
| h. Is volume > cap. (g>f) ? | NO | | | NO |

## Step 6b. VOLUME ADJUSTMENT FOR MULTIPHASE SIGNAL OVERLAP

| Probable Phase | Possible Critical Volume in vph | Volume Carryover to next phase | Adjusted Critical Volume in vph |
|---|---|---|---|
| B1 | 25(B1) | | 25 |
| A3B4 | 125(B4) | 480- 125= 355(A3) | 125 |
| A3A4 | 890(A4) OR 355(A3) | | 890 |

## Step 2. IDENTIFY VOLUMES, in vph

Approach 3:
3: LT= 125, TH= 480, RT= 0

Approach 2:
2: RT= 0, TH= 0, LT= 25

Approach 1:
1: LT= 0, TH= 0, RT= 0

Approach 4:
4: RT= 20, TH= 870, LT= 0

## Step 5. ASSIGN LANE VOLUMES, in vph

```
        | 4 1
 ------ 8 2
        0 5
        | |
        v >                v-  25

                           ^ >
                           + +

                           8
                           7 2 |
                           0 0 |
```

## Step 7. SUM OF CRITICAL VOLUMES

25(B1)+1015(B4A4)+0()+0()

= 1040 vph

## Step 8. INTERSECTION LEVEL OF SERVICE

(compare step 7 with table 6)

| C |

## Step 9. RECALCULATE

Geometric Change:
Signal Change:
Volume Change:

## Step 3. IDENTIFY PHASING

```
      v--     B1

   |   |    A3B4
   v   >
   |   ^    A3A4
   v   |
```

```
A1 -->   A3 |     B1 v--    B3  <|
           v ^                |  |
A2 <--   A4 |     B2 --^    B4 |>
```

## Step 6a. CRITICAL VOLUMES, in vph (two phase signal)

Approach 3

Approach 1

See Step 6b.

Approach 2

Approach 4

## COMMENTS

V/C Ratio = .73

```
                              Critical Movement Analysis: PLANNING
                                       Calculation Form 1

 Intersection: MORAGA RD. / SCHOOL ST.                               Design Hour: 7:30-8:30 AM
 Problem Statement: EXISTING AM
==========================================================================================================
Step 1. IDENTIFY LANE GEOMETRY          | Step 4. LEFT TURN CHECK             | Step 6b. VOLUME ADJUSTMENT FOR
        | Approach 3:MORAGA RD.         |                                     |     MULTIPHASE SIGNAL OVERLAP      |
        |    1    | |       ^           |             -------Approach-----|          Possible    Volume    Adjusted|
        |   R  L  |         N           |                 : -1- -2- -3- -4-|         Critical  Carryover  Critical|
        | R T T T L|                    |a.No. of change  :  0    0    0   0|Prob-   Volume    to next    Volume |
-------------  T H H H T  ------------- |  intervals/hour :                 |able    in vph     phase      in vph |
 Approach 1   < < | > >   ^--RT  1      |b.LT capacity on :  0    0    0   0|Phase ----------------------------------|
   LT--^        v v v    <^-RTH         |  change (vph)   :                 |
  LTH-^>                 <--TH          |c.G/C ratio      :  0    0    0   1|A2B1  126(A2) OR   20(B1)          126|
   TH-->                 <v-LTH         |d.Opposing volume: 180   0    0 525|A3B4   45(B4)  525- 45= 480(A3)      45|
  RTH-v>        ^ ^ ^    v--LT  1       |  in vph         :                 |A3A4  643(A4) OR  480(A3)           643|
   RT--v      < < | > >   Approach 2    |e.LT capacity on :  0    0    0 675|
-------------  L L T R R  ------------- |  green (vph)    :                 |
        | T T H T T |SCHOOL ST.         |f.LT capacity in :  0    0    0 675|
        |   H   H   |                   |  vph (b+e)      :                 |
        |    1 1    |                   |g.Left turn volume: 0    0    0   0|
        | Approach 4:MORAGA RD.         |  in vph         :                 |
                                        |h.Is volume > cap.: NO           NO|
                                        |  (g>f) ?        :                 |
==========================================================================================================
Step 2. IDENTIFY VOLUMES, in vph        | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES
                                        |          |                  |     |
                                        |          | 5                |     |126(A2)+688(B4A4)+0()+0()
        | Approach 3|                   |-------   2 4          -------|
1: LT=  45 | |       | 2:RT= 180        |          5 5          ^- 180|          = 814 vph
   TH= 525 | |       |   TH=   0        |          | |          v-  20|====================================
   RT=   0 | v       |   LT=  20        |          v >                | Step 8. INTERSECTION LEVEL OF
-------------        -------------      |      126                    |          SERVICE
                     <--Approach 2      |      968                    |    (compare step 7 with table 6)
                                        |       45                    |           -------
                                        |     1139/1375               |           | A | D
Approach 1-->                           |                             |           -------
-------------           -------------   |                  ^ ^ >      |====================================
1:LT=   0  |          ^ | 4: RT=  15    |                  | + +      | Step 9. RECALCULATE
  TH=   0  |          | |   TH=1270     |                   953       |
  RT=   0  |          | |   LT=   0     |-------         6 6 + 15 ----|Geometric Change:
           | Approach 4|                |     |          4 2 1 | 968  |Signal Change:
                                        |     |          3 8 5 |      |Volume Change:
==========================================================================================================
Step 3. IDENTIFY PHASING                | Step 6a. CRITICAL VOLUMES, in vph   | COMMENTS
                                        |       (two phase signal)            |
          <--  A2B1                     |        | Approach 3|                |
          v--                           |        |           |                |
       |   |   A3B4                     |        |           |                |
       v   >                            |        |           |                |
       |   ^   A3A4                     |-------------        -------------   |
       v   |                            | Approach 1                          |
                                        |                                     |
                                        |          See Step 6b.               |
                                        |                                     |
                                        |                       Approach 2    |
                                        |-------------          ------------- |
                                        |        |           |                |
----------------------------------------|        |           |                |
A1 -->   A3 |       B1 v--     B3   <|  |        |           |                |
           v ^                    | |   |        | Approach 4|                | Exclusive right turns reduced  30 %
A2 <--   A4 |       B2 --^     B4 |>    |                                     | V/C Ratio = .57 .83
```

Critical Movement Analysis: PLANNING
Calculation Form 1

Intersection: MORAGA RD. / SCHOOL ST.
Problem Statement: EXISTING PM

Design Hour: 4:30-5:30 PM

## Step 1. IDENTIFY LANE GEOMETRY

```
          | Approach 3:MORAGA RD.
          |   1   1 |     ^
          |  R   L  |     N
--        | R T T T L |
------------- T H H H T -------------
 Approach 1  < < | > >   ^--RT  1
    LT--^     v v v     <^-RTH
   LTH-^>               <--TH
    TH-->               <v-LTH
   RTH-v>     ^ ^ ^      v--LT  1
    RT--v    < < | > >   Approach 2
------------- L L T R R -------------
          | T T H T T |SCHOOL ST.
          |   H   H   |
          |    1 1    |
          | Approach 4:MORAGA RD.
```

## Step 2. IDENTIFY VOLUMES, in vph

```
            | Approach 3|
3:  LT=  20 | |        | 2:RT=  60
   TH=1090  | |        |   TH=   0
   RT=   0  | v        |   LT=  65
-------------          -------------
                         <--Approach 2

Approach 1-->
-------------          -------------
1:LT=   0  |         ^ | 4: RT=  10
  TH=   0  |         | |    TH= 750
  RT=   0  |         | |    LT=   0
           | Approach 4|
```

## Step 3. IDENTIFY PHASING

```
        <--  A2B1
        v--
      |   |  A3B4
      v   >
      |   ^  A3A4
      v   |
```

```
A1 -->  A3 |      B1 v--   B3  <|
          v ^                  | |
A2 <--  A4 |      B2 --^   B4  |>
```

## Step 4. LEFT TURN CHECK

| | Approach -1- | -2- | -3- | -4- |
|---|---|---|---|---|
| a. No. of change intervals/hour | 0 | 0 | 0 | 0 |
| b. LT capacity on change (vph) | 0 | 0 | 0 | 0 |
| c. G/C ratio | 0 | 0 | 0 | 1 |
| d. Opposing volume in vph | 60 | 0 | 0 | 1090 |
| e. LT capacity on green (vph) | 0 | 0 | 0 | 110 |
| f. LT capacity in vph (b+e) | 0 | 0 | 0 | 110 |
| g. Left turn volume in vph | 0 | 0 | 0 | 0 |
| h. Is volume > cap. (g>f) ? | NO | | | NO |

## Step 5. ASSIGN LANE VOLUMES, in vph

```
        |  | 818
        | 0
-------  9 2
        | 0 0                ^-  60
        | | |                v- (65)
        v >
```

818
65
883/1375

```
                    ^ ^ >
                    | + +

-------             3 3          -------
        |           8 7 1 |
        |           0 0 0 |
```

## Step 6a. CRITICAL VOLUMES, in vph
(two phase signal)

Approach 3

Approach 1

See Step 6b.

Approach 2

Approach 4

## Step 6b. VOLUME ADJUSTMENT FOR MULTIPHASE SIGNAL OVERLAP

| Probable Phase | Possible Critical Volume in vph | Volume Carryover to next phase | Adjusted Critical Volume in vph |
|---|---|---|---|
| A2B1 | 65(B1) OR | 42(A2) | 65 |
| A3B4 | 20(B4) | 1090- 20=1070(A3) | 20 |
| A3A4 | 1070(A3) OR | 380(A4) | 1070 |

## Step 7. SUM OF CRITICAL VOLUMES

65(B1)+1090(B4A3)+0()+0()

= 1155 vph

## Step 8. INTERSECTION LEVEL OF SERVICE
(compare step 7 with table 6)

| ~~D~~ | B

## Step 9. RECALCULATE

Geometric Change:
Signal Change:
Volume Change:

## COMMENTS

Exclusive right turns reduced 30 %
V/C Ratio = ~~.81~~ .64

Critical Movement Analysis: PLANNING
Calculation Form 1

```
Intersection: MORAGA RD. / BROOK ST.                         Design Hour: 7:30-8:30 AM
Problem Statement: EXISTING AM
==========================================================================================
Step 1. IDENTIFY LANE GEOMETRY     | Step 4. LEFT TURN CHECK            | Step 6b. VOLUME ADJUSTMENT FOR
          | Approach 3:MORAGA RD.  |       -------Approach-----|        |   MULTIPHASE SIGNAL OVERLAP
          |  1    |      ^         |       : -1-  -2-  -3-  -4-|        Possible    Volume    Adjusted
          |  R  L |      N         |a.No. of change : 0    0    0    0|Prob-  Critical   Carryover  Critical
BROOK ST. | R T T T L |            | intervals/hour :                  |able   Volume    to next    Volume
--------- | T H H H T |  --------- |b.LT capacity on : 0   0    0    0|Phase  in vph    phase      in vph
Approach 1  < < | > >    ^--RT     | change (vph)   :                  |------------------------------
   LT--^      v v v    <^-RTH      |c.G/C ratio     : 0    0    1    0|A1B2  135(A1) OR  60(B2)      135
   LTH-^>              <--TH       |d.Opposing volume: 0   75 1180   0|A4B3  105(B3) 1180- 105=1075(A4) 105
 1  TH-->              <v-LTH      | in vph          :                 |A3A4  1075(A4) OR 295(A3)     1075
   RTH-v>   ^ ^ ^       v--LT      |e.LT capacity on : 0   0   20    0|
   RT--v  < < | > >   Approach 2   | green (vph)     :                 |
---------  L L T R R  ---------    |f.LT capacity in : 0   0   20    0|
          | T T H T T |            | vph (b+e)       :                 |
          |  H   H    |            |g.Left turn volume: 0  0    0    0|
          | 1    1    |            | in vph          :                 |
          | Approach 4:MORAGA RD.  |h.Is volume > cap.:    NO   NO     |
                                   | (g>f) ?         :                 |
==========================================================================================
Step 2. IDENTIFY VOLUMES, in vph   | Step 5. ASSIGN LANE VOLUMES, in vph | Step 7. SUM OF CRITICAL VOLUMES
                                   |           2 2                      |
     | Approach 3|                 | -------  2 7 9          -------    |135(A1)+1180(B3A4)+0()+0()
3:LT=   0 | |        | 2:RT=   0   |          0 5 5                     |
  TH= 570 | |        |   TH=   0   |          + + |                     |       = 1315 vph
  RT=  20 | v        |   LT=   0   |          < v v                     |===========================
---------            ----------    |                                    | Step 8. INTERSECTION LEVEL OF
                     <--Approach 2 |        135           |   SERVICE
                                   |      + 885                         |   (compare step 7 with table 6)
Approach 1-->                      |       1020 / 1375                  |        ------
---------            ----------    |  60 +             < ^              |        | E  C
1:LT=  60 |       ^ | 4: RT=   0    |  0 ->             | |              |        ------
  TH=   0 |       | |   TH=1180    | 75 +v             1 8 |===========================
  RT=  75 |       | |   LT= 105    | -----       4  1 1 8 | Step 9. RECALCULATE
     | Approach 4|                 |             0  0 8 5 |Geometric Change:
                                   |             0  5 0                 |Signal Change:
                                   |                                    |Volume Change:
==========================================================================================
Step 3. IDENTIFY PHASING           | Step 6a. CRITICAL VOLUMES, in vph  | COMMENTS
                                   |   (two phase signal)               |
   --^      A1B2                   |      | Approach 3|                 |
   -->                             |                                    |
   <   ^    A4B3                   |                                    |
   |   |                           |                                    |
   |   ^    A3A4                   |------------         ------------   |
   v   |                           | Approach 1                         |
                                   |                                    |
                                   |        See Step 6b.                |
                                   |                                    |
                                   |                      Approach 2    |
                                   |------------         ------------   |
-----------------------------------|      |              |              |
A1 -->  A3 |    B1 v--    B3  <|   |      |              |              |
          v ^                 | |  |      | Approach 4|                 |
A2 <--  A4 |    B2 --^    B4 |>    |                                    | V/C Ratio = .92 .74
==========================================================================================
```

# Critical Movement Analysis: PLANNING

## Calculation Form 1

Intersection: MORAGA RD. / BROOK ST. — Design Hour: 4:30-5:30 PM

Problem Statement: EXISTING PM

### Step 1. IDENTIFY LANE GEOMETRY

```
              | Approach 3:MORAGA RD.
              |  1 1          |
              |  R   L    |    N
BROOK ST.     | R T T T L |
------------- T H H H T  ------------
 Approach 1   < < | > >   ^--RT
    LT--^      v v v     <^-RTH
    LTH-^>               <--TH
 1   TH-->               <v-LTH
    RTH-v>     ^ ^ ^      v--LT
    RT--v     < < | > >  Approach 2
------------- L L T R R -------------
              | T T H T T |
              |   H   H   |
              | 1     1   |
              | Approach 4:MORAGA RD.
```

### Step 4. LEFT TURN CHECK

| | -1- | -2- | -3- | -4- |
|---|---|---|---|---|
| a. No. of change intervals/hour | 0 | 0 | 0 | 0 |
| b. LT capacity on change (vph) | 0 | 0 | 0 | 0 |
| c. G/C ratio | 0 | 0 | 1 | 0 |
| d. Opposing volume in vph | 0 | 160 | 705 | 0 |
| e. LT capacity on green (vph) | 0 | 0 | 495 | 0 |
| f. LT capacity in vph (b+e) | 0 | 0 | 495 | 0 |
| g. Left turn volume in vph | 0 | 0 | 0 | 0 |
| h. Is volume > cap. (g>f) ? | | NO | NO | |

### Step 6b. VOLUME ADJUSTMENT FOR MULTIPHASE SIGNAL OVERLAP

| Probable Phase | Possible Critical Volume in vph | Volume Carryover to next phase | Adjusted Critical Volume in vph |
|---|---|---|---|
| A1B2 | 200(A1) OR 40(B2) | | 200 |
| A4B3 | 55(B3) 705- 55= 650(A4) | | 55 |
| A3A4 | 650(A4) OR 588(A3) | | 650 |

### Step 2. IDENTIFY VOLUMES, in vph

Approach 3: LT= 0, TH=1110, RT= 65

Approach 2: RT= 0, TH= 0, LT= 0

Approach 1: LT= 40, TH= 0, RT= 160

Approach 4: RT= 0, TH= 705, LT= 55

### Step 5. ASSIGN LANE VOLUMES, in vph

```
      832
        5 5
      6 2 8   278
      5 3 0
      + + |
      < v v

 40 +^               < ^
  0 ->               | |
160 +v
                       7
                     5 0
                     5 5
```

832
200
+ 55
1087/1375

### Step 7. SUM OF CRITICAL VOLUMES

200(A1)+705(B3A4)+0()+0()

= 905 vph

### Step 8. INTERSECTION LEVEL OF SERVICE

(compare step 7 with table 6)

~~B~~ C

### Step 9. RECALCULATE

Geometric Change:

Signal Change:

Volume Change:

### Step 3. IDENTIFY PHASING

```
 --^     A1B2
 -->
 <  ^    A4B3
 |  |
 |  ^    A3A4
 v  |
```

```
A1 -->   A3 |     B1 v--    B3  <|
           v ^                 | |
```

### Step 6a. CRITICAL VOLUMES, in vph

(two phase signal)

Approach 3

Approach 1

See Step 6b.

Approach 2

Approach 4

### COMMENTS

V/C Ratio = ~~.66~~ .76

```
LOCATION:MORAGA RD. / HAMLIN RD.          |NAME:EXISTING AM
--------------------------------------------------------------------------------
[HOU]RLY VOLUMES                          | VOLUMES IN PCPH
                                       N> |
 Major street:MORAGA RD.                  |
========================================= | ====================================
N= 1                  <---V5---  440 |            <---V5---
Grade   785---V2--->   v---V4---   55 |   ---V2--->      v---V4---   61
 0%     30---V3---v           N= 2 |   ---V3---v
================  <|    |>  ========= | ================  <|    |>  ========
Date of Counts: |    |     |    |        |                 |    |    |    |
12/1/87          |   V7    V9   | X STOP  |                 |   V7   V9   |
Time Period:    |    |     |    |  YIELD |                 |    |    |    |
7:30-8:30 AM    |   20    75|            |                 |   22   83|
Approach Speed:  Minor Street:   Grade   |
35 MPH          HAMLIN RD.        0%     |
PHF: 0.85        N= 1
Population: 20879
================================================================================
VOLUME ADJUSTMENTS
--------------------------------------------------------------------------------
Movement no.          |   2   |   3   |   4   |   5   |   7   |   9   |
--------------------------------------------------------------------------------
Volume (vph)          |  785  |   30  |   55  |  440  |   20  |   75  |
--------------------------------------------------------------------------------
Vol(pcph),see Table 10.1|XXXXXXXX|XXXXXXXX|  61  |XXXXXXXX|  22  |  83  |
================================================================================
[ST]EP 1 : RT From Minor Street          |          /-> V9
================================================================================
[Co]nflicting Flows, Vc                  | 1/2 V3+V2= 15 + 785 = 800 vph(Vc9)
Critical Gap, Tc                         | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                   | Cp9=  425 pcph (Fig.10.3)
Actual Capacity, Cm                      | Cm9=Cp9=  425 pcph
================================================================================
STEP 2 : LT From Major Street            |          v-- V4
================================================================================
Conflicting Flows, Vc                    | V3+V2= 30 + 785 = 815 vph(Vc4)
Critical Gap, Tc                         | Tc=    5 secs (Tab.10.2)
Potential Capacity, Cp                   | Cp4=  496 pcph (Fig.10.3)
% of Cp utilized and Impedance Factor    | (V4/Cp4)x100= 12.3% P4= .92
Actual Capacity, Cm           (Fig.10.5) | Cm4=Cp4=  496 pcph
================================================================================
STEP 3 : LT From Minor Street            |          <-\ V7
================================================================================
Conflicting Flows, Vc                    | 1/2 V3+V2+V5+V4=
                                         | 15 + 785 + 440 + 55 = 1295 vph(Vc7)
Critical Gap, Tc                         | Tc=  6.5 secs (Tab.10.2)
Potential Capacity, Cp                   | Cp7=  146 pcph (Fig.10.3)
Actual Capacity, Cm                      | Cm7=Cp7xP4= 146 x .92 = 134 pcph
================================================================================
SHARED LANE CAPACITY    SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared

                                                CR        CR       LOS   LOS
[MO]VEMENT   V(PCPH)   CM(PCPH)   CSH(PCPH)   (CM-V)   (CSH-V)    CM    CSH
================================================================================
    7          22        134         292        112       187       D     D
    9          83        425         292        342       187       B     D
    4          61        496                    435                 A
```

```
LOCATION:MORAGA RD. / HAMLIN RD.        |NAME:EXISTING PM
---------------------------------------------------------------------------
HOURLY VOLUMES                          | VOLUMES IN PCPH
                                   N>   |
Major street:MORAGA RD.                 |
======================================= | ===============================
N= 1                      <---V5--- 803 |                <---V5---
Grade   449---V2--->      v---V4---  40 |        ---V2--->      v---V4---   44
  0%      4---V3---v               N= 2 |        ---V3---v
================  <|    |>  ========= | ================ <|   |>  ========
Date of Counts: |   |    |   |          |                  |   |   |
12/1/87         |   V7   V9  | X STOP   |                  |  V7  V9  |
Time Period:    |   |    |   |  YIELD   |                  |   |   |
4:30-5:30 PM    |   10    40|           |                  |  11   44|
Approach Speed:  Minor Street:   Grade  |
35 MPH          HAMLIN RD.         0%   |
PHF: 0.85          N= 1
Population: 20879
===========================================================================
VOLUME ADJUSTMENTS
---------------------------------------------------------------------------
Movement no.            |   2   |   3   |   4   |   5   |   7   |   9   |
---------------------------------------------------------------------------
Volume (vph)            |  449  |    4  |   40  |  803  |   10  |   40  |
---------------------------------------------------------------------------
Vol(pcph),see Table 10.1|XXXXXXX|XXXXXXX|   44  |XXXXXXX|   11  |   44  |
===========================================================================
STEP 1 : RT From Minor Street           |          /-> V9
===========================================================================
Conflicting Flows, Vc                   | 1/2 V3+V2= 2 + 449 = 451 vph(Vc9)
Critical Gap, Tc                        | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp9=  662 pcph (Fig.10.3)
Actual Capacity, Cm                     | Cm9=Cp9=  662 pcph
===========================================================================
STEP 2 : LT From Major Street           |         v-- V4
===========================================================================
Conflicting Flows, Vc                   | V3+V2= 4 + 449 = 453 vph(Vc4)
Critical Gap, Tc                        | Tc=     5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp4=  752 pcph (Fig.10.3)
% of Cp utilized and Impedance Factor   | (V4/Cp4)x100=  5.9% P4= .96
Actual Capacity, Cm          (Fig.10.5) | Cm4=Cp4=  752 pcph
===========================================================================
STEP 3 : LT From Minor Street           |         <-\ V7
===========================================================================
Conflicting Flows, Vc                   | 1/2 V3+V2+V5+V4=
                                        | 2 + 449 + 803 + 40 = 1294 vph(Vc7)
Critical Gap, Tc                        | Tc=  6.5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp7=  147 pcph (Fig.10.3)
Actual Capacity, Cm                     | Cm7=Cp7xP4= 147 x .96 = 141 pcph
===========================================================================
SHARED LANE CAPACITY    SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared

                                                 CR       CR      LOS   LOS
MOVEMENT    V(PCPH)    CM(PCPH)    CSH(PCPH)   (CM-V)   (CSH-V)    CM    CSH
===========================================================================
    7          11         141         381        130      326       D     B
    9          44         662         381        618      326       A     B
    4          44         752                    708                A
```

LOCATION:MORAGA RD. / SILVER SPRINGS RD    NAME:EXISTING AM

```
-------------------------------------------------------------------------------------
HOURLY VOLUMES          Grade 0%
                      |         N = 1   |
                      |   0             |
                      |  V12            |
                      |   |   0         |        N>
                      |   |  V11        |
                      |   |   |    5    |
=====================     |   |  V10     =====================
      N= 2               <|   v   |>     ^----------V6-- 30
Grade 0%                                 <----------V5-- 435  N= 2
      0 --V1-----------^                 v----------V4-- 3
    753 --V2----------->                   major road          Grade 0%
      2 --V3-----------v       <|   ^   |> MORAGA RD.
=====================           V7  |   |  =====================
                      |          1  |   |  | STOP xx
                      |             V8  |  | YIELD
                      |  N= 1        0  |  | Date of Counts:12/1/87
                      |                 V9 | Time Period:7:30-8:30 AM
                      | minor road      55 | Prevailing Speed:35 MPH
                      | SILVER SPRINGS     | PHF:0.85
                      |   Grade 0 %        | Population:20879
=====================================================================================
```

VOLUME ADJUSTMENTS

| Movement no. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume (vph) | 0 | 753 | 2 | 3 | 435 | 30 | 1 | 0 | 55 | 5 | 0 | 0 |
| Vol(pcph),Tab.10.1 | 0 | XXXX | XXXX | 3 | XXXX | XXXX | 1 | 0 | 61 | 6 | 0 | 0 |

```
VOLUMES IN PCPH       |                 |
                      |   0             |
                      |  V12            |
                      |   |   0         |
                      |   |  V11        |
                      |   |   |    6    |
=====================     |   |  V10     =====================
                         <|   v   |>     ^----------V6-- ==
                                         <----------V5-- ==
      0 --V1-----------^                 v----------V4--  3
     == --V2----------->
     == --V3-----------v       <|   ^   |>
=====================           V7  |   |  =====================
                      |          1  |   |  |
                      |             V8  |  |
                      |              0  |  |
                      |                 V9 |
                      |                 61 |
```

LOCATION:MORAGA RD. / SILVER SPRINGS RD NAME:EXISTING AM

| STEP 1 : RT From Minor Street | /-> V9 | <-/ V12 |
|---|---|---|
| Conflicting Flows, Vc | 1/2 V3+V2=Vc9 | 1/2 V6+V5=Vc12 |
| | 1+ 753= 754 vph | 15+ 435= 450 vph |
| Critical Gap, Tc (Tab.10.2) | 5.5 (secs.) | 5.5 (secs.) |
| Potential Capacity,Cp(Fig10.3) | Cp9 = 453 pcph | Cp12 = 663 pcph |
| % of Cp utilized | (V9/Cp9)x100= 13.5% | (V12/Cp12)x100= 0% |
| Impedance Factor, P (Fig.10.5) | P9= .91 | P12= 1 |
| Actual Capacity, Cm | Cm9=Cp9= 453 pcph | Cm12=Cp12= 663 pcph |

| STEP 2 : LT From Major Street | v-- V4 | --^ V1 |
|---|---|---|
| Conflicting Flows, Vc | V3+V2=Vc4 | V6+V5=Vc1 |
| | 2+ 753= 755 vph | 30+ 435= 465 vph |
| Critical Gap, Tc (Tab.10.2) | 5 (secs.) | 5 (secs.) |
| Potential Capacity,Cp(Fig10.3) | Cp4 = 532 pcph | Cp1 = 742 pcph |
| % of Cp utilized | (V4/Cp4)x100= .6% | (V1/Cp1)x100= 0% |
| Impedance Factor, P (Fig.10.5) | P4= 1 | P1= 1 |
| Actual Capacity, Cm | Cm4=Cp4= 532 pcph | Cm1=Cp1= 742 pcph |

| STEP 3 : TH From Minor Street | ^ V8 | v V11 |
|---|---|---|
| Conflicting Flows, Vc | .5V3+V2+V1+V6+V5+V4=Vc8 | .5V6+V5+V4+V3+V2+V1=Vc11 |
| | 1+ 753+ 0+ 30+ | 15+ 435+ 3+ 2+ |
| | 435+ 3= 1222 vph | 753+ 0= 1208 vph |
| Critical Gap, Tc (Tab.10.2) | 6 (secs.) | 6 (secs.) |
| Potential Capacity,Cp(Fig10.3) | Cp8 = 198 pcph | Cp11 = 203 pcph |
| % of Cp utilized | (V8/Cp8)x100= 0% | (V11/Cp11)x100= 0% |
| Impedance Factor, P (Fig.10.5) | P8= 1 | P11= 1 |
| Actual Capacity, Cm | Cm8=Cp8xP1xP4 | Cm11=Cp11xP1xP4 |
| | 198= 198x 1x 1pcph | 203= 203x 1x 1pcph |

| STEP 4 : LT From Minor Street | <-\ V7 | \-> V10 |
|---|---|---|
| Conflicting Flows, Vc | Vc8(step3)+V11+V12=Vc7 | Vc11(step3)+V8+V9=Vc10 |
| | 1222+ 0+ 0= 1222vph | 1208+ 0+ 55= 1263vph |
| Critical Gap, Tc (Tab.10.2) | 6.5 (secs.) | 6.5 (secs.) |
| Potential Capacity,Cp(Fig10.3) | Cp7 = 165 pcph | Cp10 = 154 pcph |
| Actual Capacity, Cm | Cm7=Cp7xP1xP4xP11xP12 | Cm10=Cp10xP4xP1xP8xP9 |
| | = 165x 1x 1x 1x 1 | = 154x 1x 1x 1x.91 |
| | = 165 pcph | = 140 pcph |

LOCATION:MORAGA RD. / SILVER SPRINGS RD    NAME:EXISTING AM

SHARED LANE CAPACITY

APPROACH MOVEMENTS 7,8,9

| MOVEMENT | V(PCPH) | CM(PCPH) | CSH(PCPH) | CR (CM-V) | CR (CSH-V) | LOS CM | LOS CSH |
|---|---|---|---|---|---|---|---|
| 7 | 1 | 165 | 441 | 164 | 379 | D | B |
| 8 | 0 | 198 | 441 | 198 | 379 | D | B |
| 9 | 61 | 453 | 441 | 392 | 379 | B | B |

APPROACH MOVEMENTS 10,11,12

| MOVEMENT | V(PCPH) | CM(PCPH) | CSH(PCPH) | CR (CM-V) | CR (CSH-V) | LOS CM | LOS CSH |
|---|---|---|---|---|---|---|---|
| 10 | 6 | 140 | 140 | 134 | 134 | D | D |
| 11 | 0 | 203 | 140 | 203 | 134 | C | D |
| 12 | 0 | 663 | 140 | 663 | 134 | A | D |

MAJOR STREET LEFT TURNS 1,4

| MOVEMENT | V(PCPH) | CM(PCPH) | CR(CM-V) | LOS |
|---|---|---|---|---|
| 1 | 0 | 742 | 742 | A |
| 4 | 3 | 532 | 529 | A |

COMMENTS:

```
LOCATION:MORAGA RD. / SILVER SPRINGS RD    NAME:EXISTING PM
---------------------------------------------------------------------------------
   RLY VOLUMES                   Grade 0%
                              |         N = 1     |
                              |    2              |
                              |  V12              |
                              |   |     0         |          N>
                              |   |   V11         |
                              |   |    |     5    |
     ====================     |    |   V10        ====================
       N= 2                   <|    v    |>       ^----------V6-- 5
Grade 0%                                          <----------V5-- 775  N= 2
       1 --V1------------^                        v----------V4-- 30
     415 --V2------------>                         major road        Grade 0%
       4 --V3------------v        <|    ^    |>  MORAGA RD.
     ====================          V7   |    |   ====================
                              |     4   |    |   | STOP xx
                              |        V8    |   | YIELD
                              |  N= 1    0   |   | Date of Counts:12/1/87
                              |             V9   | Time Period:4:30-5:30 PM
                              | minor road   30  | Prevailing Speed:35 MPH
                              | SILVER SPRINGS   | PHF:0.85
                              |   Grade 0 %      | Population:20879
=================================================================================
```

VOLUME ADJUSTMENTS

| Movement no. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| me (vph) | 1 | 415 | 4 | 30 | 775 | 5 | 4 | 0 | 30 | 5 | 0 | 2 |
| Vol(pcph),Tab.10.1 | 1 | XXXX | XXXX | 33 | XXXX | XXXX | 4 | 0 | 33 | 6 | 0 | 2 |

```
VOLUMES IN PCPH               |                  |
                              |  2               |
                              | V12              |
                              |  |     0         |
                              |  |   V11         |
                              |  |    |     6    |
     ====================     |   |   V10       ====================
                              <|    v    |>     ^----------V6-- ==
                                                <----------V5-- ==
       1 --V1------------^                      v----------V4--  33
      == --V2------------>
      == --V3------------v        <|    ^    |>
     ====================          V7   |    |  ====================
                              |     4   |    |  |
                              |        V8    |  |
                              |         0    |  |
                              |             V9  |
                              |             33  |
```

```
LOCATION:MORAGA RD. / SILVER SPRINGS RD    NAME:EXISTING PM
===========================================================================
STEP 1 : RT From Minor Street ¦       /-> V9         ¦      <-/ V12
===========================================================================
Conflicting Flows, Vc         ¦ 1/2 V3+V2=Vc9         ¦ 1/2 V6+V5=Vc12
                              ¦ 2+ 415= 417 vph       ¦ 3+ 775= 778 vph
Critical Gap, Tc (Tab.10.2)   ¦ 5.5 (secs.)           ¦ 5.5 (secs.)
Potential Capacity,Cp(Fig10.3)¦ Cp9 =  687 pcph       ¦ Cp12 = 438 pcph
% of Cp utilized              ¦ (V9/Cp9)x100= 4.8%    ¦ (V12/Cp12)x100= .5%
Impedance Factor, P (Fig.10.5)¦ P9= .97               ¦ P12= 1
Actual Capacity, Cm           ¦ Cm9=Cp9=  687 pcph    ¦ Cm12=Cp12= 438 pcph

===========================================================================
STEP 2 : LT From Major Street ¦       v-- V4         ¦       --^ V1
===========================================================================
Conflicting Flows, Vc         ¦ V3+V2=Vc4             ¦ V6+V5=Vc1
                              ¦ 4+ 415= 419 vph       ¦ 5+ 775= 780 vph
Critical Gap, Tc (Tab.10.2)   ¦ 5 (secs.)             ¦ 5 (secs.)
Potential Capacity,Cp(Fig10.3)¦ Cp4 =  783 pcph       ¦ Cp1 = 517 pcph
% of Cp utilized              ¦ (V4/Cp4)x100= 4.2%    ¦ (V1/Cp1)x100= .2%
Impedance Factor, P (Fig.10.5)¦ P4= .97               ¦ P1= 1
Actual Capacity, Cm           ¦ Cm4=Cp4=  783 pcph    ¦ Cm1=Cp1= 517 pcph

===========================================================================
STEP 3 : TH From Minor Street ¦        ^  V8          ¦        v  V11
===========================================================================
Conflicting Flows, Vc         ¦.5V3+V2+V1+V6+V5+V4=Vc8¦.5V6+V5+V4+V3+V2+V1=Vc11
                              ¦ 2+ 415+ 1+ 5+         ¦ 3+ 775+ 30+ 4+
                              ¦ 775+ 30= 1228 vph     ¦ 415+ 1= 1228 vph
Critical Gap, Tc (Tab.10.2)   ¦ 6 (secs.)             ¦ 6 (secs.)
Potential Capacity,Cp(Fig10.3)¦ Cp8 =  197 pcph       ¦ Cp11 = 197 pcph
% of Cp utilized              ¦ (V8/Cp8)x100= 0%      ¦ (V11/Cp11)x100= 0%
Impedance Factor, P (Fig.10.5)¦ P8=   1               ¦ P11= 1
Actual Capacity, Cm           ¦ Cm8=Cp8xP1xP4         ¦ Cm11=Cp11xP1xP4
                              ¦ 191= 197x 1x.97pcph   ¦ 191= 197x 1x.97pcph

===========================================================================
STEP 4 : LT From Minor Street ¦      <-\ V7          ¦      \-> V10
===========================================================================
Conflicting Flows, Vc         ¦ Vc8(step3)+V11+V12=Vc7¦ Vc11(step3)+V8+V9=Vc10
                              ¦ 1228+ 0+ 2= 1230vph   ¦ 1228+ 0+ 30= 1258vph
Critical Gap, Tc (Tab.10.2)   ¦ 6.5 (secs.)           ¦ 6.5 (secs.)
Potential Capacity,Cp(Fig10.3)¦ Cp7 =  163 pcph       ¦ Cp10 = 156 pcph
Actual Capacity, Cm           ¦ Cm7=Cp7xP1xP4xP11xP12 ¦ Cm10=Cp10xP4xP1xP8xP9
                              ¦ = 163x 1x.97x 1x 1    ¦ = 156x.97x 1x 1x.97
                              ¦ = 158 pcph            ¦ = 147 pcph

===========================================================================
```

LOCATION:MORAGA RD. / SILVER SPRINGS RD     NAME:EXISTING PM

SHARED LANE CAPACITY

APPROACH MOVEMENTS 7,8,9

| MOVEMENT | V(PCPH) | CM(PCPH) | CSH(PCPH) | CR (CM-V) | CR (CSH-V) | LOS CM | LOS CSH |
|---|---|---|---|---|---|---|---|
| 7 | 4 | 158 | 504 | 154 | 467 | D | A |
| 8 | 0 | 191 | 504 | 191 | 467 | D | A |
| 9 | 33 | 687 | 504 | 654 | 467 | A | A |

APPROACH MOVEMENTS 10,11,12

| MOVEMENT | V(PCPH) | CM(PCPH) | CSH(PCPH) | CR (CM-V) | CR (CSH-V) | LOS CM | LOS CSH |
|---|---|---|---|---|---|---|---|
| 10 | 6 | 147 | 176 | 141 | 168 | D | D |
| 11 | 0 | 191 | 176 | 191 | 168 | D | D |
| 12 | 2 | 438 | 176 | 436 | 168 | A | D |

MAJOR STREET LEFT TURNS 1,4

| MOVEMENT | V(PCPH) | CM(PCPH) | CR(CM-V) | LOS |
|---|---|---|---|---|
| 1 | 1 | 517 | 516 | A |
| 4 | 33 | 783 | 750 | A |

COMMENTS:

```
LOCATION:MORAGA RD. / TANGLEWOOD DR.     |NAME:EXISTING PM
-----------------------------------------------------------------------------
    VOLUMES                              | VOLUMES IN PCPH
                                    <N   |
 Major street:MORAGA RD.                 |
======================================== | =====================================
N= 1                 <---V5---  485 |              <---V5---
Grade   840---V2--->  v---V4---    4 |       ---V2--->      v---V4---   4
 0%       15---V3---v           N= 1 |       ---V3---v
================ <|    |>  ========= | ================ <|   |>  ========
Date of Counts: |  |     |  |          |               |   |   |   |
12/1/87         |  V7    V9  | X STOP  |               |  V7  V9  |
Time Period:    |  |     |   |  YIELD  |               |   |   |   |
4:30-5:30 PM    |  10     3|           |               |  11    3|
Approach Speed:  Minor Street:  Grade  |
35 MPH          TANGLEWOOD DR.     0%  |
PHF: 0.85         N= 1
Population: 20879
```

VOLUME ADJUSTMENTS

| Movement no. | 2 | 3 | 4 | 5 | 7 | 9 |
|---|---|---|---|---|---|---|
| Volume (vph) | 840 | 15 | 4 | 485 | 10 | 3 |
| Vol(pcph),see Table 10.1 | XXXXXXX | XXXXXXX | 4 | XXXXXXXX | 11 | 3 |

1 : RT From Minor Street | /-> V9

| | |
|---|---|
| Conflicting Flows, Vc | 1/2 V3+V2= 8 + 840 = 848 vph(Vc9) |
| Critical Gap, Tc | Tc= 5.5 secs (Tab.10.2) |
| Potential Capacity, Cp | Cp9= 401 pcph (Fig.10.3) |
| Actual Capacity, Cm | Cm9=Cp9= 401 pcph |

STEP 2 : LT From Major Street | v-- V4

| | |
|---|---|
| Conflicting Flows, Vc | V3+V2= 15 + 840 = 855 vph(Vc4) |
| Critical Gap, Tc | Tc= 5 secs (Tab.10.2) |
| Potential Capacity, Cp | Cp4= 472 pcph (Fig.10.3) |
| % of Cp utilized and Impedance Factor | (V4/Cp4)x100= .8% P4= 1 |
| Actual Capacity, Cm (Fig.10.5) | Cm4=Cp4= 472 pcph |

STEP 3 : LT From Minor Street | <-\ V7

| | |
|---|---|
| Conflicting Flows, Vc | 1/2 V3+V2+V5+V4= 8 + 840 + 485 + 4 = 1337 vph(Vc7) |
| Critical Gap, Tc | Tc= 6.5 secs (Tab.10.2) |
| Potential Capacity, Cp | Cp7= 138 pcph (Fig.10.3) |
| Actual Capacity, Cm | Cm7=Cp7xP4= 138 x 1 = 138 pcph |

SHARED LANE CAPACITY SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared

| EMENT | V(PCPH) | CM(PCPH) | CSH(PCPH) | CR (CM-V) | CR (CSH-V) | LOS CM | LOS CSH |
|---|---|---|---|---|---|---|---|
| 7 | 11 | 138 | 161 | 127 | 147 | D | D |
| 9 | 3 | 401 | 161 | 398 | 147 | B | D |
| 4 | 4 | 472 | | 468 | | A | |

```
LOCATION:MORAGA RD. / TANGLEWOOD DR.     |NAME:EXISTING AM
---------------------------------------------------------------------------------
  URLY VOLUMES                           | VOLUMES IN PCPH
                                      <N |
 Major street:MORAGA RD.                 |
======================================== | =====================================
N= 1                   <---V5---  855 |                      <---V5---
Grade   490---V2--->   v---V4---    5 |          ---V2--->   v---V4---    6
 0%     10---V3---v            N= 1 |          ---V3---v
================= <|    |>  ========== | ================= <|    |>  =========
Date of Counts: |   |     |   |          |                |   |   |   |
12/1/87         |   V7    V9  | X STOP   |                |   V7  V9  |
Time Period:    |   |     |   |   YIELD  |                |   |   |   |
7:30-8:30 AM    |   20     7|            |                |   22     8|
Approach Speed:  Minor Street:   Grade   |
35 MPH          TANGLEWOOD DR.     0%    |
PHF: 0.85           N= 1
Population: 20879
=================================================================================
VOLUME ADJUSTMENTS
---------------------------------------------------------------------------------
Movement no.              |    2  |    3  |    4  |    5  |    7  |    9  |
---------------------------------------------------------------------------------
Volume (vph)              |   490 |    10 |    5  |  855  |   20  |    7  |
---------------------------------------------------------------------------------
Vol(pcph),see Table 10.1|XXXXXXX|XXXXXXX|    6  |XXXXXXX|   22  |    8  |
=================================================================================
STEP 1 : RT From Minor Street           |             /-> V9
=================================================================================
 onflicting Flows, Vc                   | 1/2 V3+V2= 5 + 490 = 495 vph(Vc9)
Critical Gap, Tc                        | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp9=  629 pcph (Fig.10.3)
Actual Capacity, Cm                     | Cm9=Cp9=  629 pcph
=================================================================================
STEP 2 : LT From Major Street           |             v-- V4
=================================================================================
Conflicting Flows, Vc                   | V3+V2= 10 + 490 = 500 vph(Vc4)
Critical Gap, Tc                        | Tc=    5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp4=  710 pcph (Fig.10.3)
% of Cp utilized and Impedance Factor   | (V4/Cp4)x100=    .8% P4=    1
Actual Capacity, Cm          (Fig.10.5) | Cm4=Cp4=  710 pcph
=================================================================================
STEP 3 : LT From Minor Street           |             <-\ V7
=================================================================================
Conflicting Flows, Vc                   | 1/2 V3+V2+V5+V4=
                                        | 5 + 490 + 855 + 5 = 1355 vph(Vc7)
Critical Gap, Tc                        | Tc=  6.5 secs (Tab.10.2)
Potential Capacity, Cp                  | Cp7=  134 pcph (Fig.10.3)
Actual Capacity, Cm                     | Cm7=Cp7xP4= 134 x 1 = 134 pcph
=================================================================================
SHARED LANE CAPACITY     SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared

                                                  CR        CR       LOS   LOS
  VEMENT    V(PCPH)    CM(PCPH)    CSH(PCPH)    (CM-V)    (CSH-V)    CM    CSH
=================================================================================
   7          22         134          170         112       140       D     D
   9           8         629          170         621       140       A     D
   4           6         710                      704                 A
```

```
LOCATION:MORAGA RD. / OLD JONAS HILL RD |NAME:EXISTING AM
--------------------------------------------------------------------------------
 RLY VOLUMES                           | VOLUMES IN PCPH
                                    N> |
 Major street:MORAGA RD.               |
====================================== | ==================================
N= 1                  <---V5---  418 |              <---V5---
Grade   725---V2--->   v---V4---   10 |       ---V2--->   v---V4---   11
 0%       0---V3---v             N= 2 |       ---V3---v
================ <|    |> ========= | ================ <|    |> ========
Date of Counts: |  |    |  |          |                  |  |    |  |
12/1/87         |  V7   V9 | X STOP   |                  |  V7   V9 |
Time Period:    |  |    |  |  YIELD   |                  |  |    |  |
7:30-8:30 AM    |   2   30|           |                  |   2   33|
Approach Speed:  Minor Street:  Grade |
35 MPH         OLD JONAS HILL     0%  |
PHF: 0.85          N= 1
Population: 20879
================================================================================
VOLUME ADJUSTMENTS
--------------------------------------------------------------------------------
Movement no.          |   2   |   3   |   4   |   5   |   7   |   9   |
--------------------------------------------------------------------------------
Volume (vph)          |  725  |     0 |   10  |  418  |    2  |   30  |
--------------------------------------------------------------------------------
Vol(pcph),see Table 10.1|XXXXXXX|XXXXXXX|  11  |XXXXXXX|    2  |   33  |
================================================================================
 P 1 : RT From Minor Street              |            /-> V9
================================================================================
Conflicting Flows, Vc                    | 1/2 V3+V2= 0 + 725 = 725 vph(Vc9)
Critical Gap, Tc                         | Tc=  5.5 secs (Tab.10.2)
Potential Capacity, Cp                   | Cp9= 470 pcph (Fig.10.3)
Actual Capacity, Cm                      | Cm9=Cp9=  470 pcph
================================================================================
STEP 2 : LT From Major Street            |            v-- V4
================================================================================
Conflicting Flows, Vc                    | V3+V2= 0 + 725 = 725 vph(Vc4)
Critical Gap, Tc                         | Tc=    5 secs (Tab.10.2)
Potential Capacity, Cp                   | Cp4=  550 pcph (Fig.10.3)
% of Cp utilized and Impedance Factor    | (V4/Cp4)x100=     2% P4= .99
Actual Capacity, Cm           (Fig.10.5) | Cm4=Cp4=  550 pcph
================================================================================
STEP 3 : LT From Minor Street            |            <-\ V7
================================================================================
Conflicting Flows, Vc                    | 1/2 V3+V2+V5+V4=
                                         | 0 + 725 + 418 + 10 = 1153 vph(Vc7)
Critical Gap, Tc                         | Tc=  6.5 secs (Tab.10.2)
Potential Capacity, Cp                   | Cp7=  184 pcph (Fig.10.3)
Actual Capacity, Cm                      | Cm7=Cp7xP4= 184 x .99 = 182 pcph
================================================================================
SHARED LANE CAPACITY    SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared
```

| EMENT | V(PCPH) | CM(PCPH) | CSH(PCPH) | CR (CM-V) | CR (CSH-V) | LOS CM | LOS CSH |
|---|---|---|---|---|---|---|---|
| 7 | 2 | 182 | 431 | 180 | 396 | D | B |
| 9 | 33 | 470 | 431 | 437 | 396 | A | B |
| 4 | 11 | 550 | | 539 | | A | |

LOCATION:MORAGA RD. / OLD JONAS HILL RD |NAME:EXISTING PM

```
HOURLY VOLUMES                          | VOLUMES IN PCPH
                                    N>  |
 Major street:MORAGA RD.                |
======================================= | ===================================
N= 1                   <---V5---  756   |                      <---V5---
Grade   410---V2--->   v---V4---   25   |         ---V2--->    v---V4---   28
 0%       2---V3---v             N= 2   |         ---V3---v
================  <|    |>  ========= | ================  <|   |>  ========
Date of Counts: |   |     |  |          |                  |   |  |  |
12/1/87         |   V7   V9  | X STOP   |                  |  V7  V9 |
Time Period:    |   |     |  |  YIELD   |                  |   |  |  |
4:30-5:30 PM    |   2    10|            |                  |   2  11|
Approach Speed:  Minor Street:   Grade  |
35 MPH         OLD JONAS HILL     0%    |
PHF: 0.85           N= 1
Population: 20879
```

## VOLUME ADJUSTMENTS

| Movement no. | 2 | 3 | 4 | 5 | 7 | 9 |
|---|---|---|---|---|---|---|
| Volume (vph) | 410 | 2 | 25 | 756 | 2 | 10 |
| Vol(pcph),see Table 10.1 | XXXXXXXX | XXXXXXXX | 28 | XXXXXXXX | 2 | 11 |

## STEP 1 : RT From Minor Street | /-> V9

| | |
|---|---|
| Conflicting Flows, Vc | 1/2 V3+V2= 1 + 410 = 411 vph(Vc9) |
| Critical Gap, Tc | Tc= 5.5 secs (Tab.10.2) |
| Potential Capacity, Cp | Cp9= 692 pcph (Fig.10.3) |
| Actual Capacity, Cm | Cm9=Cp9= 692 pcph |

## STEP 2 : LT From Major Street | v-- V4

| | |
|---|---|
| Conflicting Flows, Vc | V3+V2= 2 + 410 = 412 vph(Vc4) |
| Critical Gap, Tc | Tc= 5 secs (Tab.10.2) |
| Potential Capacity, Cp | Cp4= 789 pcph (Fig.10.3) |
| % of Cp utilized and Impedance Factor | (V4/Cp4)x100= 3.5% P4= .98 |
| Actual Capacity, Cm (Fig.10.5) | Cm4=Cp4= 789 pcph |

## STEP 3 : LT From Minor Street | <-\ V7

| | |
|---|---|
| Conflicting Flows, Vc | 1/2 V3+V2+V5+V4=<br>1 + 410 + 756 + 25 = 1192 vph(Vc7) |
| Critical Gap, Tc | Tc= 6.5 secs (Tab.10.2) |
| Potential Capacity, Cp | Cp7= 172 pcph (Fig.10.3) |
| Actual Capacity, Cm | Cm7=Cp7xP4= 172 x .98 = 169 pcph |

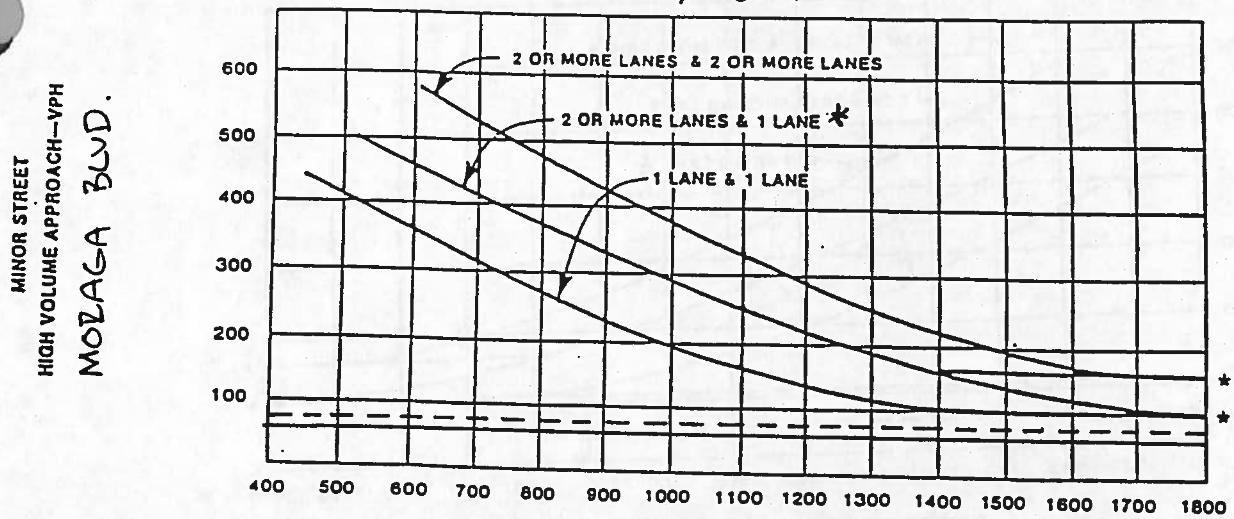
SHARED LANE CAPACITY    SH = (V7+V9)/((V7/Cm7)+(V9/Cm9)) if lane is shared

| MOVEMENT | V(PCPH) | CM(PCPH) | CSH(PCPH) | CR (CM-V) | CR (CSH-V) | LOS CM | LOS CSH |
|---|---|---|---|---|---|---|---|
| 7 | 2 | 169 | 469 | 167 | 456 | D | A |
| 9 | 11 | 692 | 469 | 681 | 456 | A | A |
| 4 | 28 | 789 | | 761 | | A | |

Figure 9-2C

## PEAK HOUR VOLUME WARRANT
## (URBAN AREAS)

MORAGA BLVD. / MORAGA RD.




MAJOR STREET—TOTAL OF BOTH APPROACHES—VPH

MORAGA RD.

* NOTE: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

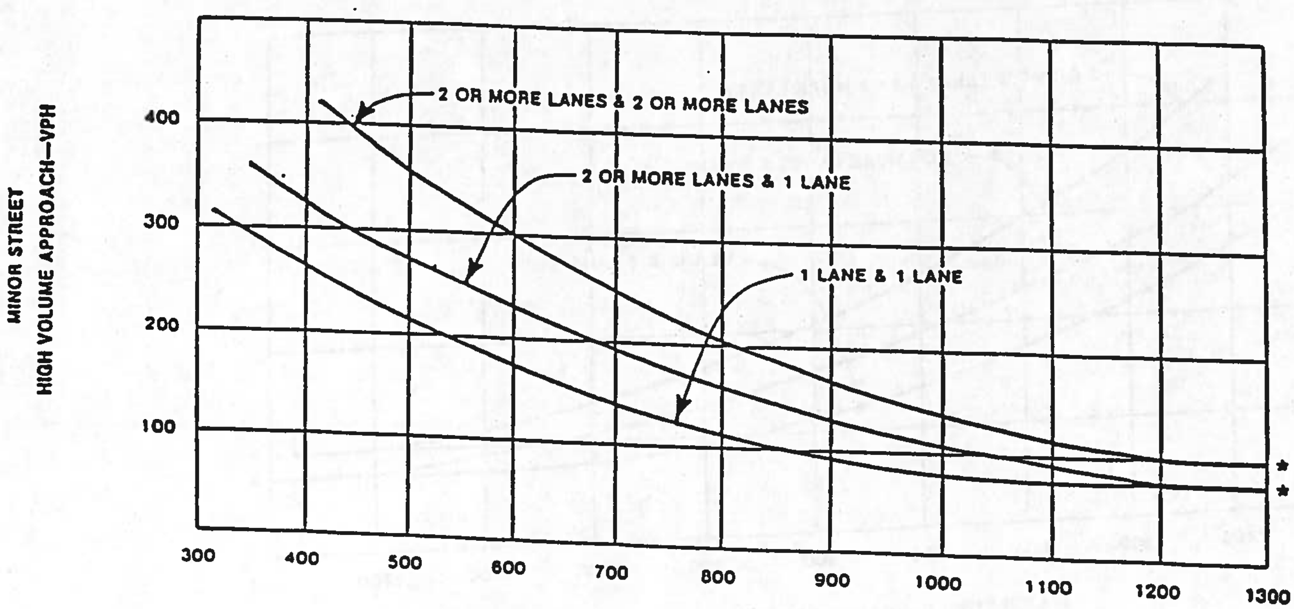
AM= ————

PM= - - - -

Figure 9-2D

## PEAK HOUR VOLUME WARRANT
## (RURAL AREAS)

( COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET )




MAJOR STREET—TOTAL OF BOTH APPROACHES—VPH

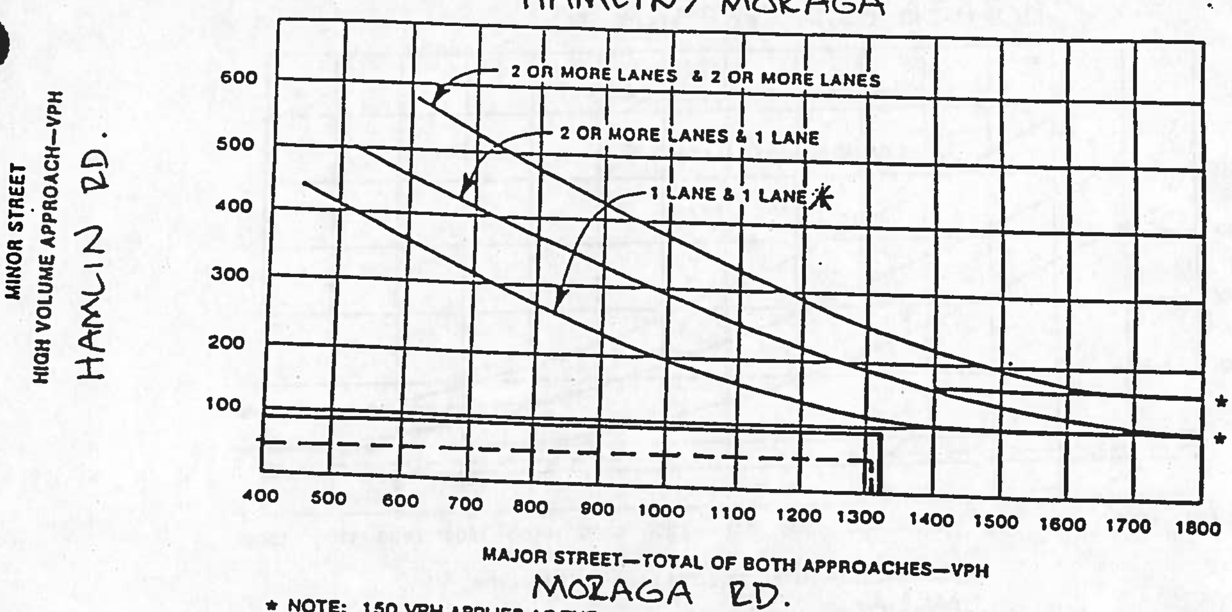
* NOTE: 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: CALIFORNIA DEPARTMENT OF TRANSPORTATION

Figure 9-2C

# PEAK HOUR VOLUME WARRANT
## (URBAN AREAS)

HAMLIN/MORAGA




* NOTE: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

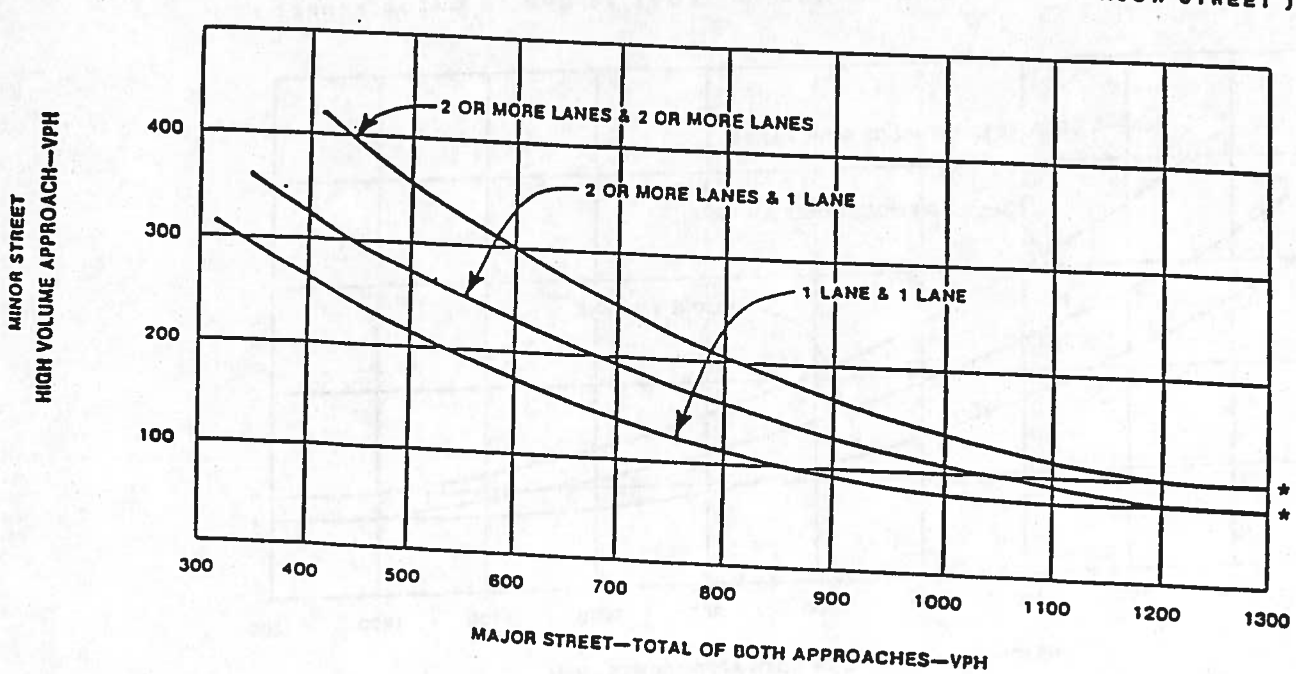
AM= ————

PM= - - - - -

Figure 9-2D

# PEAK HOUR VOLUME WARRANT
## (RURAL AREAS)

( COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET )



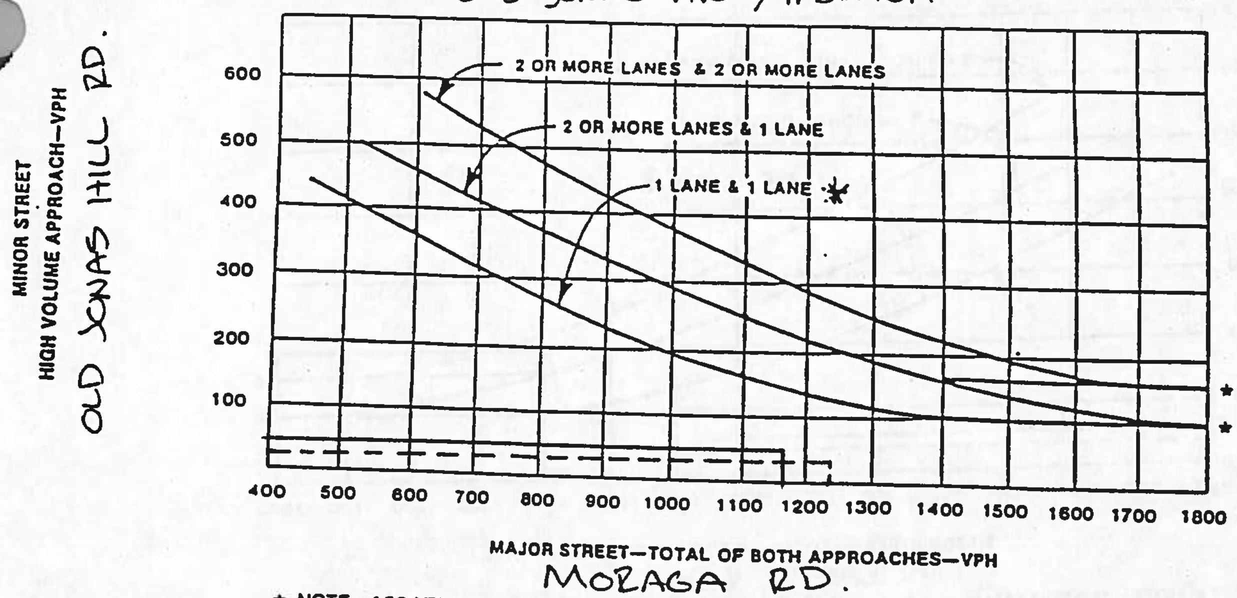

* NOTE: 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: CALIFORNIA DEPARTMENT OF TRANSPORTATION

Figure 9-2C

## PEAK HOUR VOLUME WARRANT
## (URBAN AREAS)

OLD JONAS HILL/MORAGA




★ NOTE: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

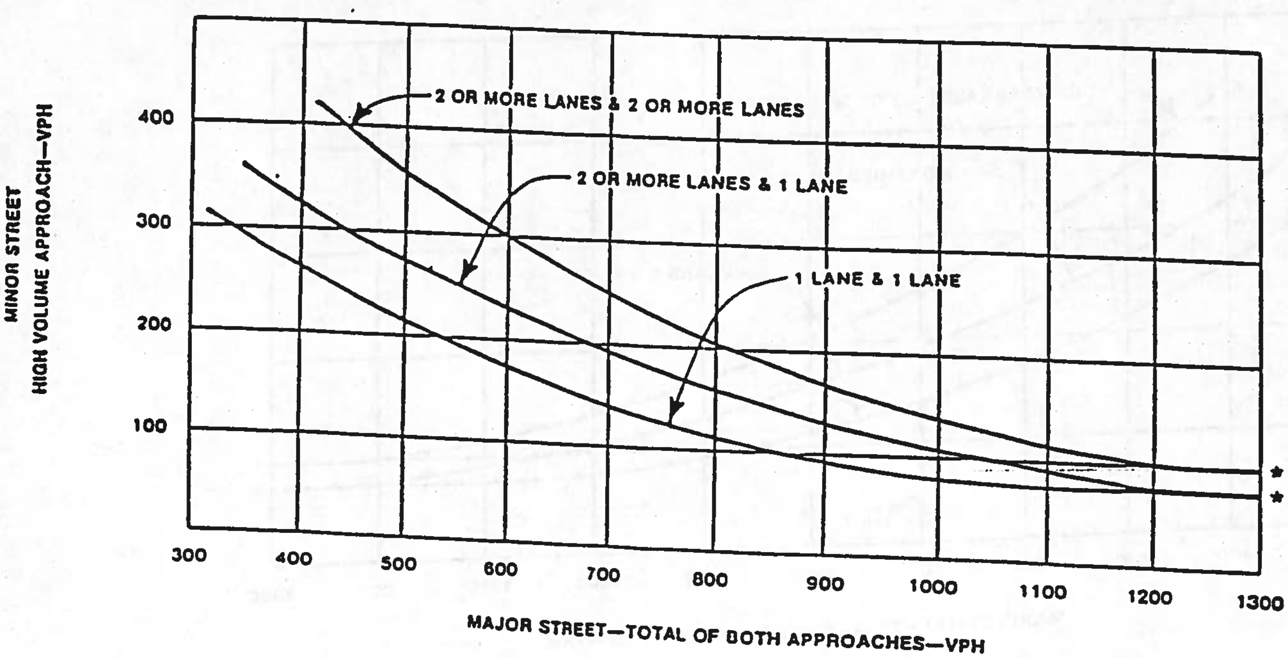
AM = ______

PM = ----

Figure 9-2D

## PEAK HOUR VOLUME WARRANT
## (RURAL AREAS)

( COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET )



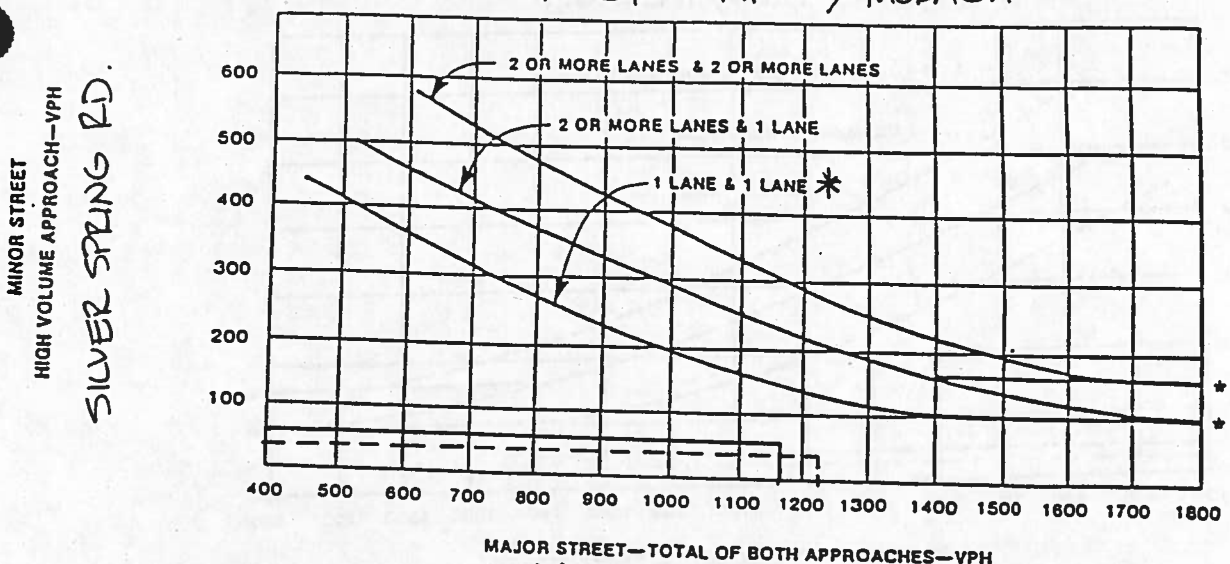

★ NOTE: 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: CALIFORNIA DEPARTMENT OF TRANSPORTATION

Figure 9-2C

## PEAK HOUR VOLUME WARRANT (URBAN AREAS)

SILVER SPRINGS/MORAGA




* NOTE: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

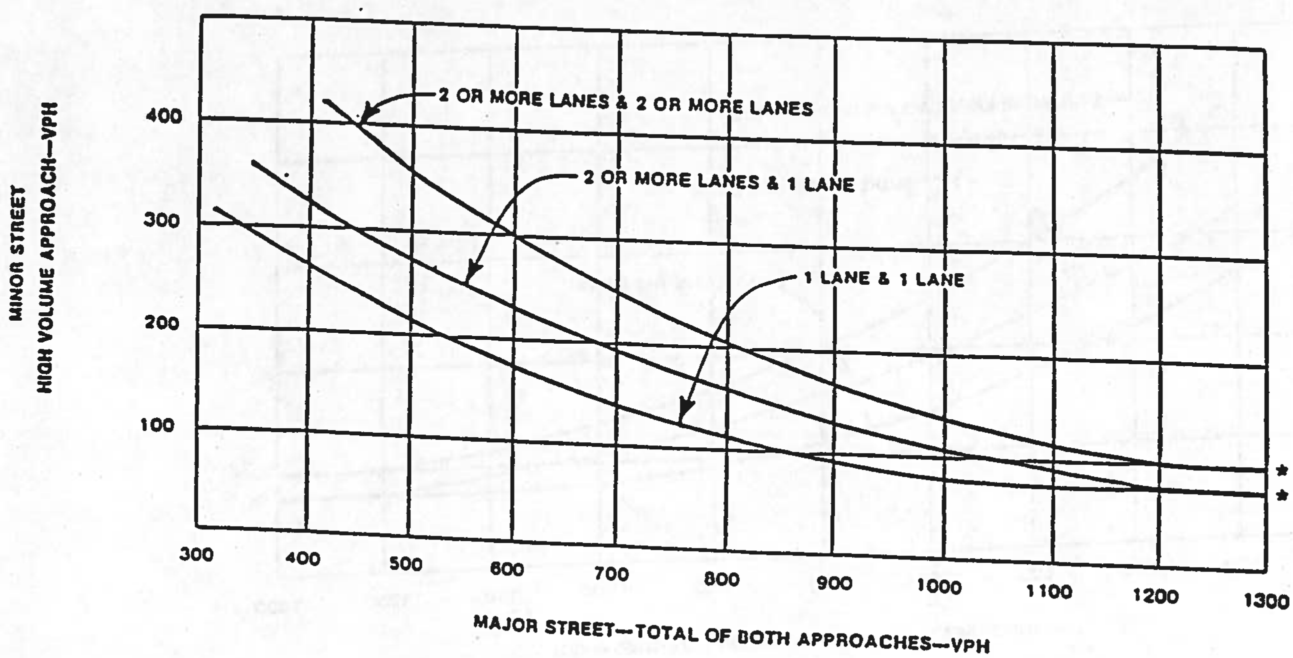
AM= ———

PM= - - - - -

Figure 9-2D

## PEAK HOUR VOLUME WARRANT (RURAL AREAS)

( COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET )




* NOTE: 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Source: CALIFORNIA DEPARTMENT OF TRANSPORTATION

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

ROJECT: MORAGA RD. COUNTS DATE: 2-13-89
[illegible]ET: MORAGA RD. CITY: LAFAYETTE STATE: CA
[illegible]TION: NORTH OF VIA GRANADA

| OUR EGUN | A1 | A2 | A3 | A4 | A | B1 | B2 | B3 | B4 | B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | DIRECTION: NORTHBOUND | | | | | DIRECTION: SOUTHBOUND | |
| 1100 | | | | | 439 | | | | | 374 | 813 |
| 1200 | | | | | 449 | | | | | 442 | 891 |
| 1300 | | | | | 453 | | | | | 422 | 875 |
| 1400 | | | | | 473 | | | | | 511 | 984 |
| 1500 | | | | | 541 | | | | | 525 | 1066 |
| 1600 | | | | | 458 | | | | | 564 | 1022 |
| 1700 | | | | | 426 | | | | | 766 | 1192 |
| 1800 | | | | | 387 | | | | | 582 | 969 |
| 1900 | | | | | 257 | | | | | 336 | 593 |
| 2000 | | | | | 166 | | | | | 218 | 384 |
| [illegible]0 | | | | | 140 | | | | | 229 | 369 |
| 2200 | | | | | 89 | | | | | 163 | 252 |
| 2300 | | | | | 33 | | | | | 70 | 103 |
| 2400 | | | | | 16 | | | | | 25 | 41 |
| 100 | | | | | 9 | | | | | 11 | 20 |
| 200 | | | | | 9 | | | | | 8 | 17 |
| 300 | | | | | 9 | | | | | 17 | 26 |
| 400 | | | | | 27 | | | | | 25 | 52 |
| 500 | | | | | 54 | | | | | 40 | 94 |
| 600 | | | | | 246 | | | | | 138 | 384 |
| 700 | | | | | 619 | | | | | 325 | 944 |
| 800 | | | | | 593 | | | | | 374 | 967 |
| 900 | | | | | 535 | | | | | 344 | 879 |
| [illegible]0 | | | | | 467 | | | | | 334 | 801 |
| OTALS | | | | | 6895 | | | | | 6843 | 13738 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

PROJECT: MORAGA RD. COUNTS    DATE: 2-14-89
STREET: MORAGA RD.    CITY: LAFAYETTE    STATE: CA
LOCATION: NORTH OF VIA GRANADA

| HOUR BEGUN | A1 | A2 | A3 | A4 | DIRECTION: NORTHBOUND A | B1 | B2 | B3 | B4 | DIRECTION: SOUTHBOUND B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1100 | | | | | 433 | | | | | 427 | 860 |
| 1200 | | | | | 467 | | | | | 418 | 885 |
| 1300 | | | | | 439 | | | | | 419 | 858 |
| 1400 | | | | | 498 | | | | | 510 | 1008 |
| 1500 | | | | | 548 | | | | | 525 | 1073 |
| 1600 | | | | | 460 | | | | | 607 | 1067 |
| 1700 | | | | | 472 | | | | | 791 | 1263 |
| 1800 | | | | | 448 | | | | | 598 | 1046 |
| 1900 | | | | | 331 | | | | | 407 | 738 |
| 2000 | | | | | 184 | | | | | 291 | 475 |
| 2100 | | | | | 208 | | | | | 336 | 544 |
| 2200 | | | | | 83 | | | | | 191 | 274 |
| 2300 | | | | | 46 | | | | | 85 | 131 |
| 2400 | | | | | 23 | | | | | 40 | 63 |
| 100 | | | | | 13 | | | | | 13 | 26 |
| 200 | | | | | 11 | | | | | 18 | 29 |
| 300 | | | | | 7 | | | | | 7 | 14 |
| 400 | | | | | 17 | | | | | 19 | 36 |
| 500 | | | | | 68 | | | | | 40 | 108 |
| 600 | | | | | 233 | | | | | 129 | 362 |
| 700 | | | | | 629 | | | | | 338 | 967 |
| 800 | | | | | 637 | | | | | 396 | 1033 |
| 900 | | | | | 518 | | | | | 320 | 838 |
| 1000 | | | | | 438 | | | | | 343 | 781 |
| TOTALS | | | | | 7211 | | | | | 7268 | 14479 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

ROJECT: MORAGA RD. COUNTS DATE: 2-15-89
TREET: MORAGA RD. CITY: LAFAYETTE STATE: CA
TION: NORTH OF VIA GRANADA

| OUR EGUN | A1 | A2 | A3 | A4 | A | B1 | B2 | B3 | B4 | B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | DIRECTION: NORTHBOUND | | | | | DIRECTION: SOUTHBOUND | | | | | |
| 1100 | | | | | 417 | | | | | 356 | 773 |
| 1200 | | | | | 431 | | | | | 423 | 854 |
| 1300 | | | | | 409 | | | | | 419 | 828 |
| 1400 | | | | | 471 | | | | | 481 | 952 |
| 1500 | | | | | 540 | | | | | 545 | 1085 |
| 1600 | | | | | 495 | | | | | 592 | 1087 |
| 1700 | | | | | 435 | | | | | 768 | 1203 |
| 1800 | | | | | 375 | | | | | 561 | 936 |
| 1900 | | | | | 289 | | | | | 372 | 661 |
| 2000 | | | | | 175 | | | | | 297 | 472 |
| [illegible]0 | | | | | 247 | | | | | 267 | 514 |
| 2200 | | | | | 103 | | | | | 176 | 279 |
| 2300 | | | | | 57 | | | | | 80 | 137 |
| 2400 | | | | | 18 | | | | | 31 | 49 |
| 100 | | | | | 14 | | | | | 15 | 29 |
| 200 | | | | | 9 | | | | | 16 | 25 |
| 300 | | | | | 10 | | | | | 12 | 22 |
| 400 | | | | | 17 | | | | | 30 | 47 |
| 500 | | | | | 53 | | | | | 34 | 87 |
| 600 | | | | | 251 | | | | | 142 | 393 |
| 700 | | | | | 604 | | | | | 328 | 932 |
| 800 | | | | | 584 | | | | | 380 | 964 |
| 900 | | | | | 510 | | | | | 329 | 839 |
| [illegible]00 | | | | | 477 | | | | | 311 | 788 |
| TOTALS | | | | | 6991 | | | | | 6965 | 13956 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

OJECT: MORAGA RD. COUNTS DATE: 2-16-89
T: MORAGA RD. CITY: LAFAYETTE STATE: CA
ON: NORTH OF VIA GRANADA

| UR<br>GUN | A1 | A2 | A3 | A4 | A | B1 | B2 | B3 | B4 | B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | DIRECTION: NORTHBOUND | | | | | DIRECTION: SOUTHBOUND | |
| .100 | | | | | 470 | | | | | 394 | 864 |
| .200 | | | | | 439 | | | | | 428 | 867 |
| .300 | | | | | 431 | | | | | 505 | 936 |
| .400 | | | | | 469 | | | | | 486 | 955 |
| .500 | | | | | 610 | | | | | 545 | 1155 |
| .600 | | | | | 488 | | | | | 586 | 1074 |
| 1700 | | | | | 429 | | | | | 742 | 1171 |
| 1800 | | | | | 423 | | | | | 552 | 975 |
| 1900 | | | | | 275 | | | | | 407 | 682 |
| 2000 | | | | | 189 | | | | | 262 | 451 |
| [illegible] | | | | | 225 | | | | | 297 | 522 |
| 2200 | | | | | 117 | | | | | 176 | 293 |
| 2300 | | | | | 52 | | | | | 86 | 138 |
| 2400 | | | | | 29 | | | | | 46 | 75 |
| 100 | | | | | 13 | | | | | 25 | 38 |
| 200 | | | | | 15 | | | | | 20 | 35 |
| 300 | | | | | 15 | | | | | 17 | 32 |
| 400 | | | | | 25 | | | | | 20 | 45 |
| 500 | | | | | 67 | | | | | 45 | 112 |
| 600 | | | | | 245 | | | | | 104 | 349 |
| 700 | | | | | 511 | | | | | 238 | 749 |
| 800 | | | | | 559 | | | | | 332 | 891 |
| 900 | | | | | 469 | | | | | 338 | 807 |
| OTALS | | | | | 6565 | | | | | 6651 | 13216 |

NOT 24 HRS!

# OMNI-MEANS ENGINEERS & PLANNERS
## TRAFFIC COUNTS

ROJECT: MORAGA ROAD COUNTS DATE: 2-13-89
TREET: MORAGA RD. CITY: LAFAYETTE STATE: CA
ATION: SOUTH OF HERMAN

| IOUR EGUN | A1 | A2 | A3 | A4 | A (DIRECTION: SOUTHBOUND) | B1 | B2 | B3 | B4 | B (DIRECTION: NORTHBOUND) | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1100 | | | | | 447 | | | | | 499 | 946 |
| 1200 | | | | | 521 | | | | | 508 | 1029 |
| 1300 | | | | | 502 | | | | | 508 | 1010 |
| 1400 | | | | | 626 | | | | | 556 | 1182 |
| 1500 | | | | | 674 | | | | | 592 | 1266 |
| 1600 | | | | | 699 | | | | | 537 | 1236 |
| 1700 | | | | | 933 | | | | | 482 | 1415 |
| 1800 | | | | | 709 | | | | | 413 | 1122 |
| 1900 | | | | | 422 | | | | | 311 | 733 |
| 2000 | | | | | 279 | | | | | 193 | 472 |
| 2100 | | | | | 285 | | | | | 151 | 436 |
| 2200 | | | | | 191 | | | | | 113 | 304 |
| 2300 | | | | | 81 | | | | | 46 | 127 |
| 2400 | | | | | 28 | | | | | 18 | 46 |
| 100 | | | | | 15 | | | | | 12 | 27 |
| 200 | | | | | 13 | | | | | 11 | 24 |
| 300 | | | | | 15 | | | | | 11 | 26 |
| 400 | | | | | 26 | | | | | 34 | 60 |
| 500 | | | | | 45 | | | | | 71 | 116 |
| 600 | | | | | 145 | | | | | 278 | 423 |
| 700 | | | | | 380 | | | | | 734 | 1114 |
| 800 | | | | | 526 | | | | | 713 | 1239 |
| 900 | | | | | 415 | | | | | 616 | 1031 |
| 1000 | | | | | 395 | | | | | 542 | 937 |
| TOTALS | | | | | 8372 | | | | | 7949 | 16321 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

PROJECT: MORAGA ROAD COUNTS DATE: 2-14-89
STREET: MORAGA RD. CITY: LAFAYETTE STATE: CA
LOCATION: SOUTH OF HERMAN

| HOUR BEGUN | A1 | A2 | A3 | A4 | A (DIRECTION: SOUTHBOUND) | B1 | B2 | B3 | B4 | B (DIRECTION: NORTHBOUND) | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1100 | | | | | 520 | | | | | 487 | 1007 |
| 1200 | | | | | 486 | | | | | 525 | 1011 |
| 1300 | | | | | 513 | | | | | 481 | 994 |
| 1400 | | | | | 661 | | | | | 575 | 1236 |
| 1500 | | | | | 634 | | | | | 617 | 1251 |
| 1600 | | | | | 731 | | | | | 532 | 1263 |
| 1700 | | | | | 943 | | | | | 548 | 1491 |
| 1800 | | | | | 772 | | | | | 491 | 1263 |
| 1900 | | | | | 498 | | | | | 395 | 893 |
| 2000 | | | | | 362 | | | | | 218 | 580 |
| 2100 | | | | | 388 | | | | | 251 | 639 |
| 2200 | | | | | 230 | | | | | 94 | 324 |
| 2300 | | | | | 98 | | | | | 56 | 154 |
| 2400 | | | | | 44 | | | | | 24 | 68 |
| 100 | | | | | 20 | | | | | 16 | 36 |
| 200 | | | | | 20 | | | | | 13 | 33 |
| 300 | | | | | 10 | | | | | 9 | 19 |
| 400 | | | | | 17 | | | | | 20 | 37 |
| 500 | | | | | 43 | | | | | 88 | 131 |
| 600 | | | | | 141 | | | | | 277 | 418 |
| 700 | | | | | 372 | | | | | 737 | 1109 |
| 800 | | | | | 522 | | | | | 728 | 1250 |
| 900 | | | | | 393 | | | | | 602 | 995 |
| 1000 | | | | | 398 | | | | | 477 | 875 |
| TOTALS | | | | | 8816 | | | | | 8261 | 17077 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

ROJECT: MORAGA ROAD COUNTS DATE: 2-15-89
[illegible]ET: MORAGA RD. CITY: LAFAYETTE STATE: CA
[illegible]ATION: SOUTH OF HERMAN

| IOUR | DIRECTION: SOUTHBOUND | | | | | | DIRECTION: NORTHBOUND | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EGUN | A1 | A2 | A3 | A4 | A | B1 | B2 | B3 | B4 | B | TOTAL |
| 1100 | | | | | 451 | | | | | 476 | 927 |
| 1200 | | | | | 490 | | | | | 483 | 973 |
| 1300 | | | | | 508 | | | | | 446 | 954 |
| 1400 | | | | | 626 | | | | | 503 | 1129 |
| 1500 | | | | | 674 | | | | | 616 | 1290 |
| 1600 | | | | | 698 | | | | | 595 | 1293 |
| 1700 | | | | | 928 | | | | | 469 | 1397 |
| 1800 | | | | | 678 | | | | | 422 | 1100 |
| 1900 | | | | | 479 | | | | | 333 | 812 |
| 2000 | | | | | 350 | | | | | 201 | 551 |
| [illegible]00 | | | | | 336 | | | | | 282 | 618 |
| 2200 | | | | | 214 | | | | | 119 | 333 |
| 2300 | | | | | 102 | | | | | 64 | 166 |
| 2400 | | | | | 36 | | | | | 28 | 64 |
| 100 | | | | | 17 | | | | | 15 | 32 |
| 200 | | | | | 17 | | | | | 9 | 26 |
| 300 | | | | | 16 | | | | | 14 | 30 |
| 400 | | | | | 28 | | | | | 19 | 47 |
| 500 | | | | | 36 | | | | | 68 | 104 |
| 600 | | | | | 155 | | | | | 273 | 428 |
| 700 | | | | | 355 | | | | | 727 | 1082 |
| 800 | | | | | 472 | | | | | 698 | 1170 |
| 900 | | | | | 394 | | | | | 604 | 998 |
| [illegible]00 | | | | | 371 | | | | | 532 | 903 |
| TOTALS | | | | | 8431 | | | | | 7996 | 16427 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

PROJECT: MORAGA ROAD COUNTS DATE: 2-16-89
STREET: MORAGA RD. CITY: LAFAYETTE STATE: CA
[illegible]TION: SOUTH OF HERMAN

| HOUR BEGUN | A1 | A2 | A3 | A4 | A (DIRECTION: SOUTHBOUND) | B1 | B2 | B3 | B4 | B (DIRECTION: NORTHBOUND) | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1100 | | | | | 449 | | | | | 526 | 975 |
| 1200 | | | | | 520 | | | | | 492 | 1012 |
| 1300 | | | | | 583 | | | | | 474 | 1057 |
| 1400 | | | | | 606 | | | | | 537 | 1143 |
| 1500 | | | | | 662 | | | | | 630 | 1292 |
| 1600 | | | | | 699 | | | | | 635 | 1334 |
| 1700 | | | | | 906 | | | | | 474 | 1380 |
| 1800 | | | | | 677 | | | | | 479 | 1156 |
| 1900 | | | | | 495 | | | | | 332 | 827 |
| 2000 | | | | | 330 | | | | | 220 | 550 |
| [illegible]00 | | | | | 361 | | | | | 233 | 594 |
| 2200 | | | | | 205 | | | | | 127 | 332 |
| 2300 | | | | | 109 | | | | | 61 | 170 |
| 2400 | | | | | 54 | | | | | 38 | 92 |
| 100 | | | | | 29 | | | | | 19 | 48 |
| 200 | | | | | 24 | | | | | 17 | 41 |
| 300 | | | | | 17 | | | | | 18 | 35 |
| 400 | | | | | 24 | | | | | 28 | 52 |
| 500 | | | | | 46 | | | | | 77 | 123 |
| 600 | | | | | 120 | | | | | 292 | 412 |
| 700 | | | | | 260 | | | | | 611 | 871 |
| 800 | | | | | 399 | | | | | 658 | 1057 |
| 900 | | | | | 396 | | | | | 560 | 956 |
| [illegible]LS | | | | | 7971 | | | | | 7538 | 15509 |

NOT 24 HOURS!

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

OJECT: MORAGA RD. COUNTS DATE: 2-13-89
T: MORAGA ROAD CITY: LAFAYETTE STATE: CA
TION: ~~SOUTH~~ NORTH OF BROOK STREET

DIRECTION: NORTHBOUND DIRECTION: SOUTHBOUND

| OUR EGUN | A1 | A2 | A3 | A4 | A | B1 | B2 | B3 | B4 | B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | | | | | 852 | | | | | 582 | 1434 |
| 1300 | | | | | 767 | | | | | 577 | 1344 |
| 1400 | | | | | 938 | | | | | 659 | 1597 |
| 1500 | | | | | 956 | | | | | 732 | 1688 |
| 1600 | | | | | 947 | | | | | 720 | 1667 |
| 1700 | | | | | 856 | | | | | 948 | 1804 |
| 1800 | | | | | 659 | | | | | 727 | 1386 |
| 1900 | | | | | 505 | | | | | 548 | 1053 |
| 2000 | | | | | 309 | | | | | 352 | 661 |
| 2100 | | | | | 287 | | | | | 310 | 597 |
| [illegible]0 | | | | | 165 | | | | | 208 | 373 |
| 2300 | | | | | 71 | | | | | 91 | 162 |
| 2400 | | | | | 29 | | | | | 40 | 69 |
| 100 | | | | | 16 | | | | | 17 | 33 |
| 200 | | | | | 12 | | | | | 12 | 24 |
| 300 | | | | | 15 | | | | | 15 | 30 |
| 400 | | | | | 47 | | | | | 27 | 74 |
| 500 | | | | | 159 | | | | | 45 | 204 |
| 600 | | | | | 478 | | | | | 114 | 592 |
| 700 | | | | | 1172 | | | | | 289 | 1461 |
| 800 | | | | | 1312 | | | | | 442 | 1754 |
| 900 | | | | | 954 | | | | | 486 | 1440 |
| 1000 | | | | | 898 | | | | | 537 | 1435 |
| [illegible]00 | | | | | 854 | | | | | 592 | 1446 |
| TOTALS | | | | | 13258 | | | | | 9070 | 22328 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

PROJECT: MORAGA RD. COUNTS DATE: 2-14-89
STREET: MORAGA ROAD CITY: LAFAYETTE STATE: CA
LOCATION: ~~SOUTH~~ NORTH OF BROOK STREET

| HOUR BEGUN | A1 | A2 | A3 | A4 | DIRECTION: NORTHBOUND A | B1 | B2 | B3 | B4 | DIRECTION: SOUTHBOUND B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | | | | | 871 | | | | | 597 | 1468 |
| 1300 | | | | | 763 | | | | | 600 | 1363 |
| 1400 | | | | | 993 | | | | | 672 | 1665 |
| 1500 | | | | | 1024 | | | | | 709 | 1733 |
| 1600 | | | | | 906 | | | | | 803 | 1709 |
| 1700 | | | | | 909 | | | | | 950 | 1859 |
| 1800 | | | | | 766 | | | | | 846 | 1612 |
| 1900 | | | | | 564 | | | | | 573 | 1137 |
| 2000 | | | | | 303 | | | | | 411 | 714 |
| 2100 | | | | | 334 | | | | | 419 | 753 |
| [illegible]00 | | | | | 174 | | | | | 263 | 437 |
| 2300 | | | | | 77 | | | | | 97 | 174 |
| 2400 | | | | | 35 | | | | | 49 | 84 |
| 100 | | | | | 25 | | | | | 23 | 48 |
| 200 | | | | | 14 | | | | | 18 | 32 |
| 300 | | | | | 12 | | | | | 13 | 25 |
| 400 | | | | | 35 | | | | | 15 | 50 |
| 500 | | | | | 160 | | | | | 42 | 202 |
| 600 | | | | | 484 | | | | | 120 | 604 |
| 700 | | | | | 1120 | | | | | 326 | 1446 |
| 800 | | | | | 1339 | | | | | 449 | 1788 |
| 900 | | | | | 922 | | | | | 445 | 1367 |
| 1000 | | | | | 807 | | | | | 482 | 1289 |
| [illegible]00 | | | | | 891 | | | | | 563 | 1454 |
| TOTALS | | | | | 13528 | | | | | 9485 | 23013 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

OJECT: MORAGA RD. COUNTS DATE: 2-15-89
[illegible]T: MORAGA ROAD CITY: LAFAYETTE STATE: CA
[illegible]TION: ~~SOUTH~~ NORTH OF BROOK STREET

DIRECTION: NORTHBOUND DIRECTION: SOUTHBOUND

| OUR EGUN | A1 | A2 | A3 | A4 | A | B1 | B2 | B3 | B4 | B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | | | | | 822 | | | | | 595 | 1417 |
| 1300 | | | | | 779 | | | | | 611 | 1390 |
| 1400 | | | | | 939 | | | | | 698 | 1637 |
| 1500 | | | | | 1009 | | | | | 699 | 1708 |
| 1600 | | | | | 922 | | | | | 752 | 1674 |
| 1700 | | | | | 806 | | | | | 927 | 1733 |
| 1800 | | | | | 696 | | | | | 823 | 1519 |
| 1900 | | | | | 495 | | | | | 604 | 1099 |
| 2000 | | | | | 338 | | | | | 406 | 744 |
| 2100 | | | | | 473 | | | | | 379 | 852 |
| [illegible]0 | | | | | 199 | | | | | 277 | 476 |
| 2300 | | | | | 82 | | | | | 117 | 199 |
| 2400 | | | | | 36 | | | | | 47 | 83 |
| 100 | | | | | 19 | | | | | 26 | 45 |
| 200 | | | | | 12 | | | | | 21 | 33 |
| 300 | | | | | 15 | | | | | 17 | 32 |
| 400 | | | | | 37 | | | | | 31 | 68 |
| 500 | | | | | 150 | | | | | 38 | 188 |
| 600 | | | | | 456 | | | | | 158 | 614 |
| 700 | | | | | 1119 | | | | | 333 | 1452 |
| 800 | | | | | 1223 | | | | | 465 | 1688 |
| 900 | | | | | 922 | | | | | 467 | 1389 |
| 1000 | | | | | 864 | | | | | 452 | 1316 |
| [illegible]00 | | | | | 876 | | | | | 548 | 1424 |
| OTALS | | | | | 13289 | | | | | 9491 | 22780 |

OMNI-MEANS ENGINEERS & PLANNERS
TRAFFIC COUNTS

ROJECT: MORAGA RD. COUNTS      DATE: 2-16-89
TREET: MORAGA ROAD      CITY: LAFAYETTE      STATE: CA
[illegible]ION: ~~SOUTH~~ NORTH OF BROOK STREET

| OUR EGUN | A1 | A2 | A3 | A4 | DIRECTION: NORTHBOUND A | B1 | B2 | B3 | B4 | DIRECTION: SOUTHBOUND B | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | | | | | 854 | | | | | 605 | 1459 |
| 1300 | | | | | 779 | | | | | 663 | 1442 |
| 1400 | | | | | 901 | | | | | 674 | 1575 |
| 1500 | | | | | 1009 | | | | | 748 | 1757 |
| 1600 | | | | | 989 | | | | | 719 | 1708 |
| 1700 | | | | | 803 | | | | | 934 | 1737 |
| 1800 | | | | | 710 | | | | | 763 | 1473 |
| 1900 | | | | | 496 | | | | | 581 | 1077 |
| 2000 | | | | | 363 | | | | | 410 | 773 |
| 2100 | | | | | 347 | | | | | 422 | 769 |
| [illegible]00 | | | | | 208 | | | | | 263 | 471 |
| 2300 | | | | | 85 | | | | | 154 | 239 |
| 2400 | | | | | 49 | | | | | 69 | 118 |
| 100 | | | | | 25 | | | | | 35 | 60 |
| 200 | | | | | 20 | | | | | 25 | 45 |
| 300 | | | | | 19 | | | | | 20 | 39 |
| 400 | | | | | 46 | | | | | 25 | 71 |
| 500 | | | | | 146 | | | | | 55 | 201 |
| 600 | | | | | 476 | | | | | 115 | 591 |
| 700 | | | | | 930 | | | | | 298 | 1228 |
| 800 | | | | | 933 | | | | | 486 | 1419 |
| 900 | | | | | 869 | | | | | 474 | 1343 |
| TOTALS | | | | | 11057 | | | | | 8538 | 19595 |

NOT 24 HOURS!