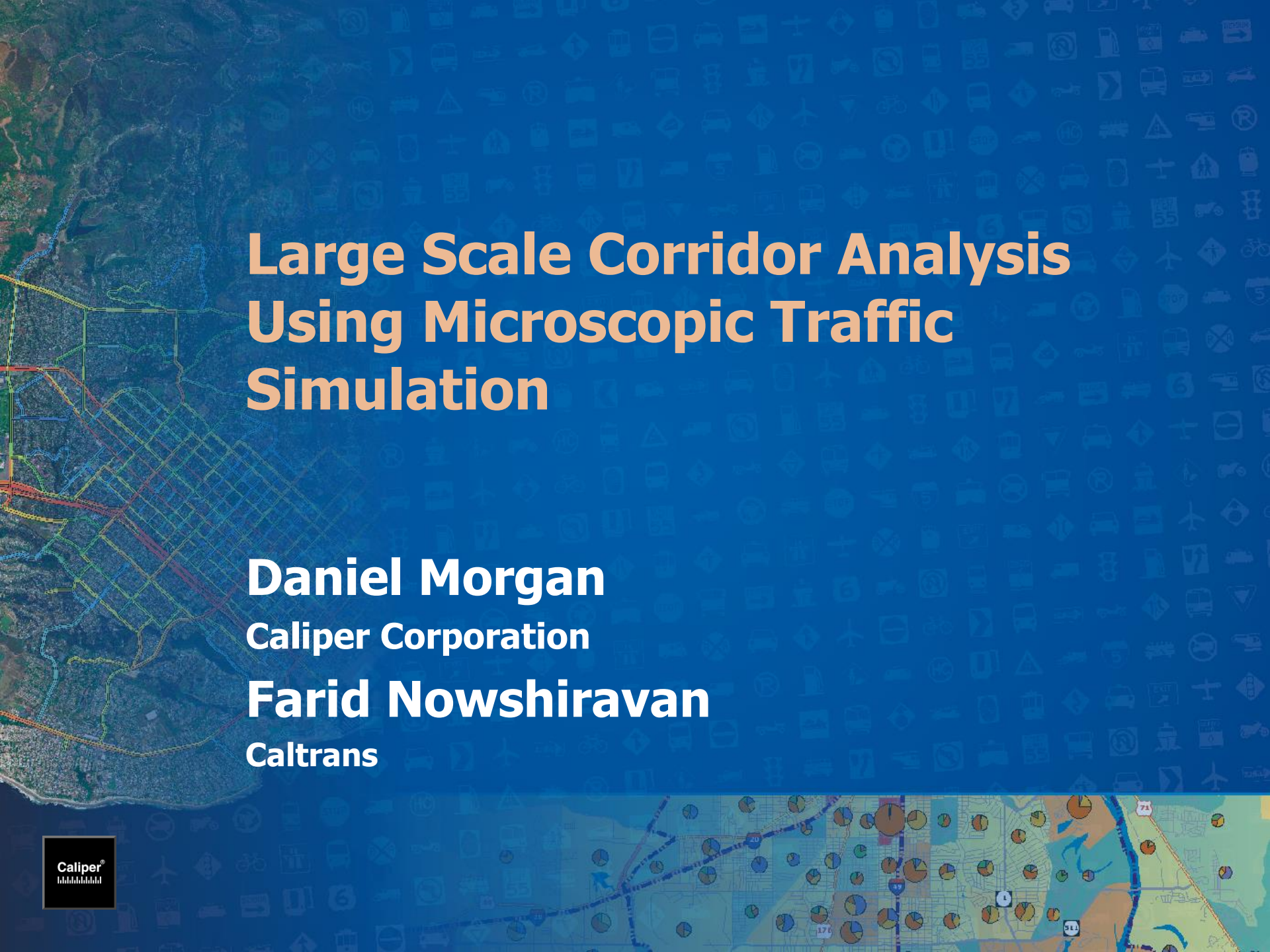


The background of the slide is a dark blue map of a coastal region, likely San Francisco, with a grid of yellow and red lines representing major roads. Overlaid on this is a dense pattern of small, light blue icons representing various modes of transportation, including cars, buses, bicycles, and airplanes.

# Large Scale Corridor Analysis Using Microscopic Traffic Simulation

**Daniel Morgan**

Caliper Corporation

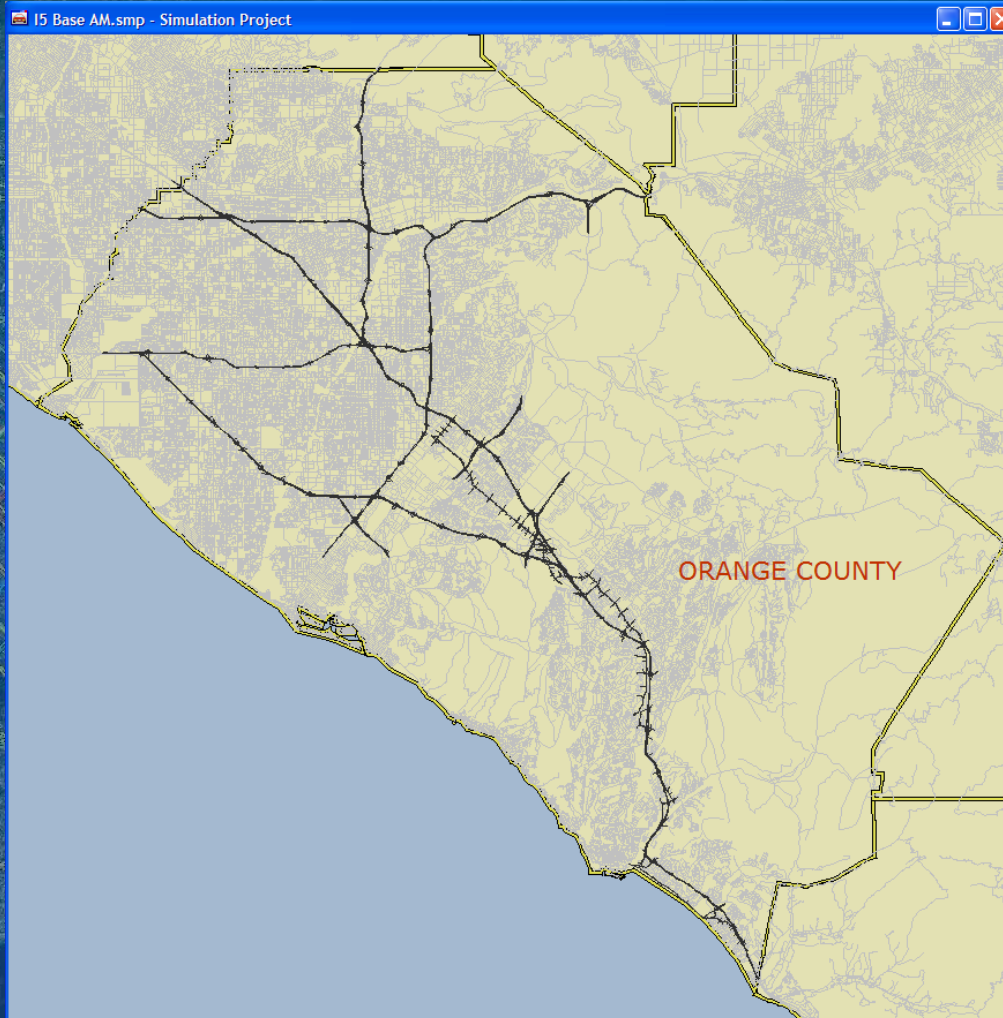
**Farid Nowshiravan**

Caltrans

# Outline

- **Introduction and Background**
  - Project Scope
  - Objectives
- **Approach**
  - Data Requirements and Availability
  - Tools and Methodology
- **Results To Date**
  - Speeds and Counts
  - Measures of Performance
- **Future Work**

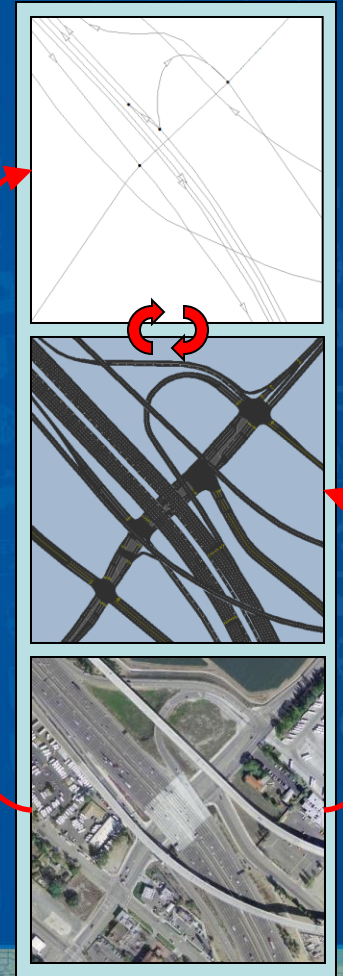
# Project Description: Scope & Objectives



- **Scope**
  - 665 Freeway & Ramp miles
  - 65 Arterial miles
  - 2,000 lane-miles
  - 280 ramp origins & destinations
- **Objectives**
  - Demonstration
  - Pilot/Test
  - Research
  - Calibration
  - Application/Practice

# Project Description: Analysis

- **Demand Modeling with TransCAD**
  - Demand Forecasting
  - Subarea Analysis
  - Land Use and Demographics
- **Traffic Modeling with TransModeler**
  - Traffic Impact
  - Alternatives Analysis
  - Incident & Corridor Management
- **Data Collection and Processing**
  - Calibration
  - Validation



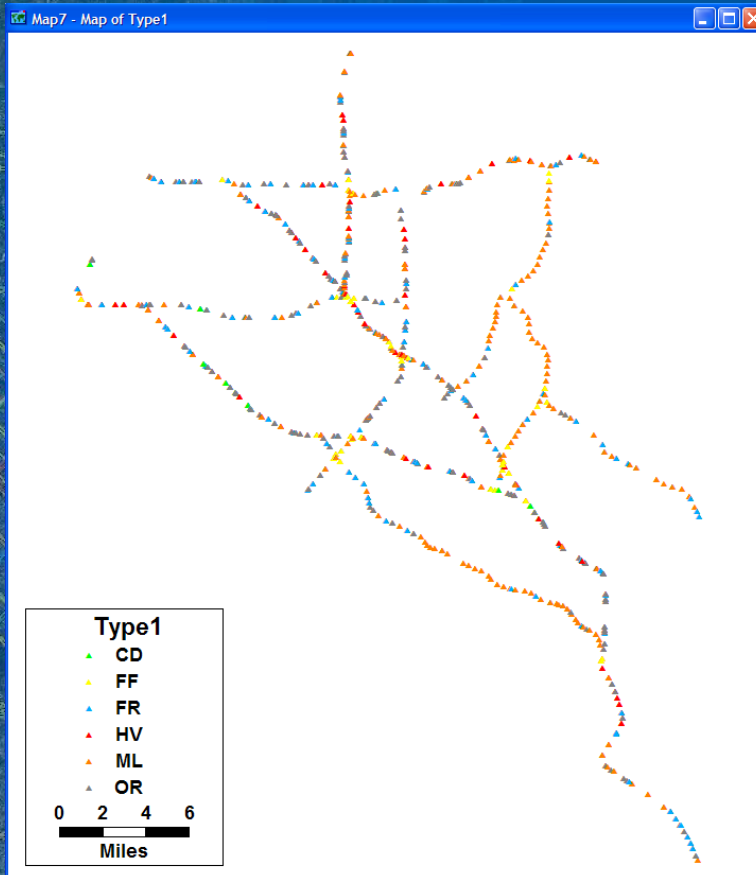
# Approach

- **Model Development**
- **Origin-Destination Demand Matrix Estimation**
  - OCTA Planning Model
  - PeMS Counts
- **Validation**
  - Tach run speeds
  - Tach run travel times
- **Development of Scenarios**
- **Simulation and Output Comparison**

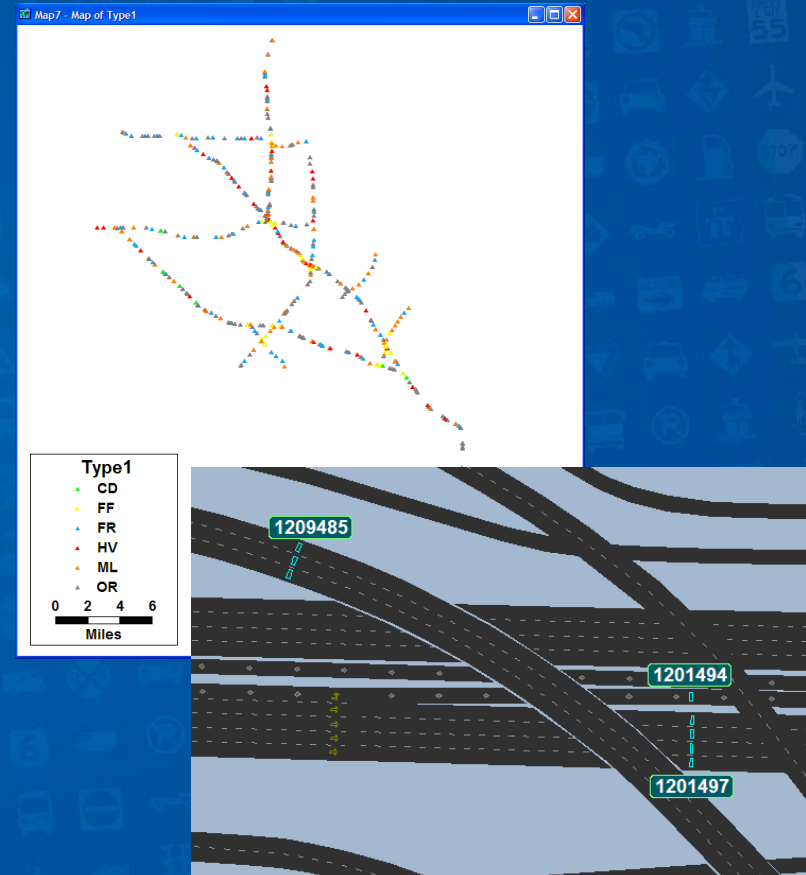
# Model Development: Network Editing



# Model Development: PeMS Detectors



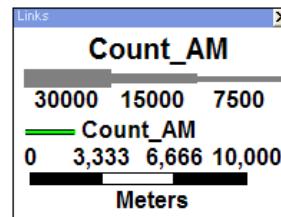
1,888 Stations in Orange County



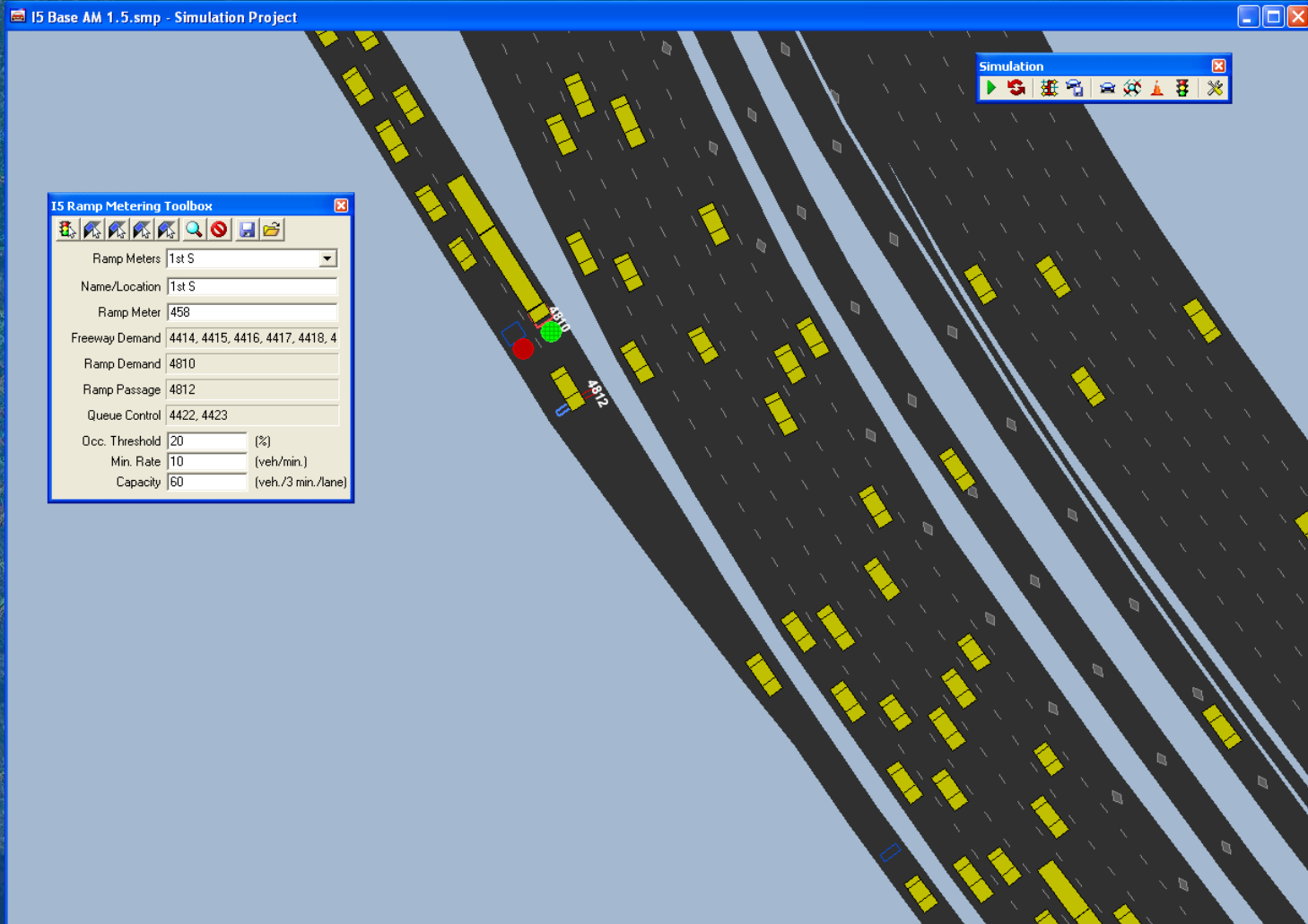
1,239 Identified and Placed in Model

# PeMS AM Counts Sample: I5 Mainline Northbound and Southbound

- Stations with Non-Zero Counts: 797
- Stations Passing QA: 577
- Gaps: HOV and a Few Key Locations



# Model Development: Ramp Meters



# Data Requirements and Availability

- **Imagery**
  - Aerial photography
  - Photolog
- **Traffic Counts**
  - PeMS 5-minute counts
  - Manual ramp turning movement counts
  - Manual arterial intersection turning movement counts
  - Truck (HPMS and WIMS)
- **Travel Times and Speeds**
  - Origin-Destination tach run travel times
  - District 12 2005 HOV Report  
(HOV and Mixed lane use tach run speeds by postmile)
  - GPS files collected from tach runs

# Tach Run Speeds by Postmile

| Location               | Post Mile | HOV Lane Speed (MPH) |         |         |         |         |         |         |
|------------------------|-----------|----------------------|---------|---------|---------|---------|---------|---------|
|                        |           | 6:00 AM              | 6:30 AM | 7:00 AM | 7:30 AM | 8:00 AM | 8:30 AM | 9:00 AM |
| Orangethorpe OC        | 0.430     | 61.28                | 64.41   | 62.62   | 56.36   | 66.20   | 70.22   | 62.62   |
| SB Knott Ave On        | 1.826     | 72.89                | 66.42   | 67.37   | 50.11   | 66.49   | 71.90   | 76.07   |
| SB Beach Blvd On       | 2.578     | 77.46                | 63.12   | 58.85   | 61.68   | 61.92   | 68.81   | 81.46   |
| off to Magnolia        | 3.333     | 80.64                | 64.42   | 39.86   | 58.04   | 48.91   | 69.66   | 79.66   |
| WB off to Magnolia Ave | 4.031     | 78.51                | 62.36   | 52.15   | 59.70   | 60.88   | 69.38   | 76.09   |
| EB on Brookhurst St    | 5.081     | 75.46                | 58.85   | 52.91   | 55.67   | 60.94   | 63.34   | 76.13   |
| EB on Euclid Ave       | 6.104     | 72.97                | 59.17   | 56.40   | 47.17   | 59.23   | 62.97   | 75.67   |
| EB Conn Frontage Rd    | 6.940     | 72.51                | 61.90   | 57.17   | 43.65   | 55.18   | 60.08   | 69.30   |
| EB off to East/Raymond | 7.784     | 73.38                | 65.68   | 63.65   | 63.75   | 64.56   | 65.72   | 68.79   |
| Sunkist St OC SS-425   | 9.564     | 73.70                | 65.61   | 66.28   | 63.74   | 63.22   | 65.03   | 65.59   |
| Jct St 57              | 9.793     | 75.18                | 69.81   | 69.25   | 65.71   | 65.67   | 67.20   | 65.86   |
| EB off to Kraemer      | 10.720    | 74.31                | 74.06   | 66.69   | 67.90   | 64.94   | 68.39   | 67.32   |
| EB on from Kraemer     | 11.265    | 71.15                | 68.00   | 66.46   | 66.71   | 65.73   | 66.23   | 69.39   |
| EB off to Tustin Ave   | 11.853    | 70.00                | 70.64   | 66.83   | 66.28   | 65.72   | 63.46   | 68.52   |
| WB on from Tustin Ave  | 11.958    | 70.37                | 69.40   | 68.43   | 65.38   | 62.47   | 61.65   | 69.77   |

| Location                   | Post Mile | Mixed-Flow Lane Speed (MPH) |         |         |         |         |         |         |
|----------------------------|-----------|-----------------------------|---------|---------|---------|---------|---------|---------|
|                            |           | 6:00 AM                     | 6:30 AM | 7:00 AM | 7:30 AM | 8:00 AM | 8:30 AM | 9:00 AM |
| Orangethorpe OC            | 0.430     | 58.76                       | 63.45   | 27.51   | 18.84   | 14.67   | 54.7    | 67.26   |
| SB Knott Ave On            | 1.826     | 69.95                       | 31.98   | 35.09   | 29.31   | 20.46   | 30.37   | 56.13   |
| SB Beach Blvd On           | 2.578     | 67.72                       | 33.47   | 35.45   | 23.88   | 19.60   | 27.02   | 24.33   |
| off to Magnolia            | 3.333     | 68.69                       | 50.16   | 54.60   | 17.44   | 16.46   | 47.76   | 36.67   |
| WB off to Magnolia Ave     | 4.031     | 65.18                       | 56.10   | 32.43   | 15.34   | 15.19   | 32.13   | 18.80   |
| EB on Brookhurst St        | 5.081     | 63.70                       | 58.29   | 23.23   | 16.21   |         |         |         |
| EB on Euclid Ave           | 6.104     | 60.21                       | 59.43   | 48.98   | 28.15   |         |         |         |
| EB Conn Frontage Rd        | 6.940     | 60.65                       | 59.88   | 49.93   | 39.98   |         |         |         |
| EB off to East/Raymond     | 7.784     | 55.95                       | 54.30   | 51.99   | 45.68   |         |         |         |
| Sunkist St OC SS-425       | 9.564     | 55.41                       | 48.26   | 41.90   | 51.97   |         |         |         |
| Jct St 57                  | 9.793     | 62.62                       | 63.72   | 64.59   | 59.87   |         |         |         |
| EB off to Kraemer/Glasell  | 10.720    | 59.83                       | 67.36   | 64.05   | 63.14   |         |         |         |
| EB on from Kraemer/Glasell | 11.265    | 63.84                       | 65.59   | 59.54   | 62.39   |         |         |         |
| EB off to Tustin Ave       | 11.853    | 59.39                       | 58.97   | 58.80   | 60.62   |         |         |         |
| WB on from Tustin Ave      | 11.958    | 59.83                       | 62.03   | 60.55   | 59.17   |         |         |         |

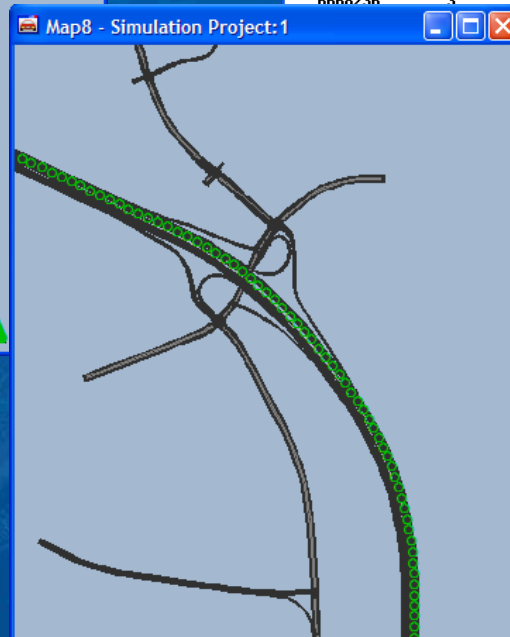
15 Base AM 1.5.smp - Simulation Project



Dataview1 - ProcSpeeds

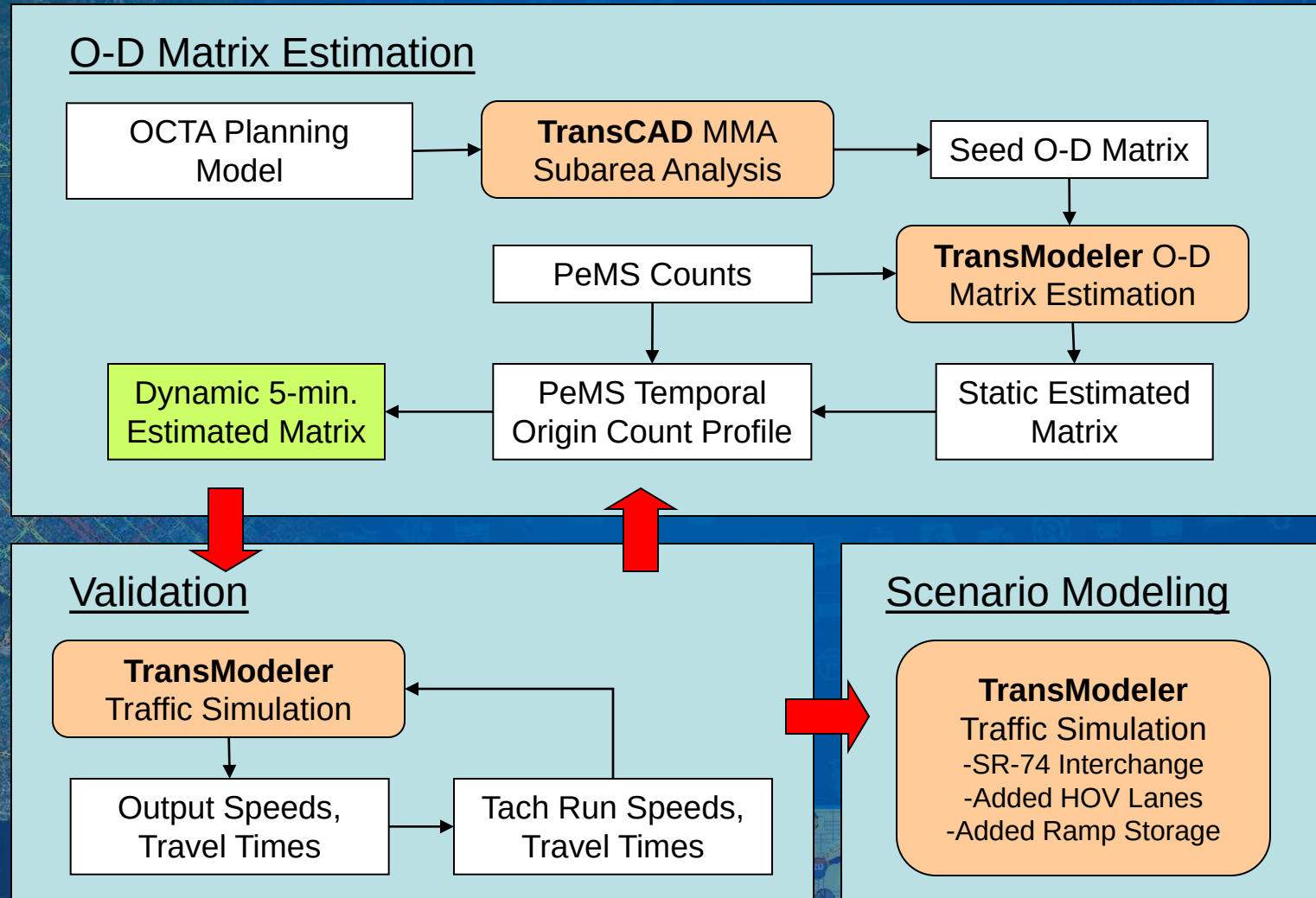
| Location              | [Caltrans-PM] Dn | [SegmentID-1] | [SegmentID-2] | [6:00 AM] | [6:30 AM] | [7:00 AM] | [7:30 AM] | [8:00 AM] | [8:30 AM] | [9:00 AM] |
|-----------------------|------------------|---------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Brookhurst St OC      | 40.714 N         | 147370        | 147367        | 64.66     | 45.86     | 25.02     | 11.34     | 12.11     | 14.33     | 12.48     |
| Harbor Blvd OC        | 37.400 N         | 147382        | 147970        | 48.78     | 51.73     | 39.54     | 50.21     | 29.28     | 59.80     | 67.92     |
| Katella Ave OC        | 36.371 N         | 147393        | 146943        | 58.01     | 57.59     | 54.06     | 26.26     | 32.44     | 29.36     | 51.20     |
| State College Blvd UC | 35.204 N         | 86165         | --            | 63.50     | 43.18     | 56.83     | 21.48     | 13.16     | 30.71     | 24.40     |
| Chapman Ave UC        | 34.826 N         | 148040        | --            | 64.87     | 48.92     | 21.99     | 12.26     | 23.71     | 18.81     | 31.59     |
| Jct 5/22              | 33.997 N         | 146971        | 21256         | 63.77     | 20.84     | 22.65     | 10.23     | 15.09     | 12.78     | 14.14     |
| Broadway St OC        | 33.310 N         | 21305         | 6668210       | 63.79     | 23.30     | 25.10     | 12.28     | 13.90     | 21.44     | 17.66     |
| 17th St UC            | 32.462 N         | 6668243       | --            | 48.94     | 26.42     | 29.23     | 21.91     | 15.07     | 17.21     | 20.52     |
| Grand Ave UC          | 31.759 N         | 6668117       | --            | 36.81     | 28.15     | 37.33     | 19.49     | 20.07     | 24.97     | 31.23     |
| Fourth St OC          | 31.085 N         | 6668106       | --            | 41.00     | 36.47     | 54.13     | 30.64     | 22.64     | 35.08     | 30.63     |
| First St OC           | 30.903 N         | 6668106       | 6674874       | 40.27     | 33.14     | 60.34     | 50.54     | 16.74     | 25.77     | 40.79     |
| Main St UC            | 30.511 N         | 6670529       | 6712481       | 42.25     | 38.37     | 17.86     | 36.15     | 42.52     | 39.96     | 43.83     |
| Jct 5/55 Sep          | 30.263 N         | 6712478       | 6668044       | 55.49     | 45.49     | 37.61     | 48.28     | 54.76     | 46.24     | 52.78     |
| Tustin R.R. on        | 28.417 N         | 6668589       | 6712730       | 58.67     | 59.55     | 60.91     | 60.26     | 67.92     | 68.72     | 66.40     |
| Jamboree Rd On        | 27.551 N         | 6668720       | 6712711       | 63.19     | 59.50     | 56.38     | 63.57     | 61.06     | 66.02     | 67.46     |
| Junipero Serra Off    | 10.714 N         | 6713006       | --            | 66.47     | 70.12     | 73.23     | 62.00     | 63.71     | 64.00     | 64.93     |
| Avery Pkwy Off        | 12.820 N         | 6668225       | 6713014       | 71.22     | 70.14     | 72.80     | 68.10     | 68.98     | 70.74     | 67.69     |
| Crown Valley Pkwy off | 13.572 N         | 6668235       | 6668236       | 68.01     | 67.95     | 74.39     | 64.94     | 65.85     | 70.10     | 69.17     |
| Oso Pkwy Off          | 14.945 N         | 6668244       | 6714263       | 66.70     | 65.70     | 70.46     | 57.84     | 28.19     | 36.58     | 63.42     |
| La Paz Rd Off         | 16.373 N         | 6668228       | 6714270       | 66.40     | 61.73     | 32.06     | 24.90     | 29.02     | 43.78     | 34.66     |
| Alicia Pkwy Off       | 17.297 N         | 6712871       | 6712337       | 66.29     | 64.28     | 48.49     | 31.59     | 35.51     | 44.59     | 68.11     |
| NB off El Toro Rd     | 18.490 N         | 6668090       | 6714487       | 63.57     | 66.68     | 42.93     | 31.59     | 31.76     | 57.65     | 72.88     |
| Lake Forest Dr Off    | 19.631 N         | 6668096       | 6712333       | 64.89     | 69.33     | 59.86     | 53.80     | 54.07     | 60.74     | 71.37     |
| Jct 5/405             | 21.304 N         | 6712806       | 6714502       | 71.00     | 70.90     | 70.15     | 69.40     | 71.87     | 70.97     | 71.13     |
| Alton Pkwy OC         | 22.213 N         | 6712648       | 6668953       | 63.70     | 59.93     | 63.45     | 62.62     | 64.25     | 67.54     | 63.90     |
| On from SR-133        | 23.350 N         | 6712656       | 6712652       | 69.36     | 67.80     | 67.83     | 73.28     | 68.91     | 67.11     | 66.13     |
| Sand Canyon UC        | 23.820 N         | 6712656       | 6668214       | 65.18     | 71.34     | 65.12     | 64.81     | 62.82     | 66.95     | 63.99     |

# GPS Data



| Segment | Interval | NObservations | High_Speed | Low_Speed | Avg_Speed | StdDev_Speed |
|---------|----------|---------------|------------|-----------|-----------|--------------|
| 6668231 | 5        | 4             | 73.9707    | 65.7518   | 71.915992 | 3.558919     |
| 6668231 | 6        | 3             | 73.9707    | 59.1766   | 66.299696 | 6.052100     |
| 6668235 | 1        | 3             | 66.5026    | 66.5026   | 66.502587 | 0.000000     |
| 6668235 | 2        | 3             | 66.5026    | 22.1675   | 40.640470 | 18.838777    |
| 6668235 | 3        | 1             | 33.2513    | 33.2513   | 33.251293 | 0.000000     |
| 6668235 | 4        | 5             | 66.5026    | 7.3892    | 36.945882 | 25.703290    |
| 6668235 | 5        | 3             | 66.5026    | 13.3005   | 37.684799 | 21.944734    |
| 6668235 | 6        | 6             | 66.5026    | 11.0838   | 44.335058 | 23.072696    |
| 6668236 | 1        | 3             | 74.3665    | 67.2840   | 70.766210 | 2.892632     |
| 6668236 | 2        | 3             | 61.4332    | 58.8735   | 60.579951 | 1.206662     |
| 6668236 | 3        | 2             | 74.3665    | 70.6482   | 72.507330 | 1.859162     |
|         | 6        | 6             | 70.6482    | 11.5817   | 51.743353 | 22.755096    |
|         | 3        | 3             | 67.2840    | 24.7888   | 53.118923 | 20.032401    |
|         | 6        | 6             | 67.2840    | 11.7747   | 56.547567 | 20.138035    |
|         | 3        | 3             | 67.0957    | 64.0459   | 66.079053 | 1.437691     |
|         | 4        | 4             | 58.7087    | 19.5696   | 40.536957 | 18.278948    |
|         | 3        | 3             | 44.0315    | 21.3486   | 33.535119 | 9.337054     |
|         | 6        | 6             | 70.4504    | 8.1446    | 37.251298 | 23.593044    |
|         | 3        | 3             | 64.0459    | 13.6797   | 33.134202 | 22.100332    |
|         | 5        | 5             | 64.0459    | 19.3015   | 43.597190 | 17.615286    |
|         | 3        | 3             | 74.3811    | 66.1165   | 70.167757 | 3.375939     |
|         | 4        | 4             | 79.3398    | 62.6367   | 69.524673 | 6.237551     |
|         | 3        | 3             | 66.1165    | 59.5049   | 63.912617 | 3.116762     |
|         | 4        | 4             | 79.3398    | 56.6713   | 64.538156 | 8.802359     |
|         | 3        | 3             | 70.0057    | 59.5049   | 65.209019 | 4.334715     |
|         | 3        | 3             | 74.3811    | 62.6367   | 67.711416 | 4.925473     |
|         | 3        | 3             | 76.2444    | 67.7728   | 73.420486 | 3.993548     |
|         | 4        | 4             | 76.2444    | 55.4504   | 65.115757 | 7.766922     |
|         | 3        | 3             | 67.7728    | 67.7728   | 67.772757 | 0.000000     |
|         | 4        | 4             | 76.2444    | 55.4504   | 63.421438 | 7.741681     |
|         | 3        | 3             | 76.2444    | 60.9955   | 68.337530 | 6.238121     |
|         | 3        | 3             | 76.2444    | 60.9955   | 68.337530 | 6.238121     |
|         | 3        | 3             | 64.2879    | 64.2879   | 64.287880 | 0.000000     |
|         | 4        | 4             | 64.2879    | 55.1039   | 61.991884 | 3.976781     |

# Tools/Methodology

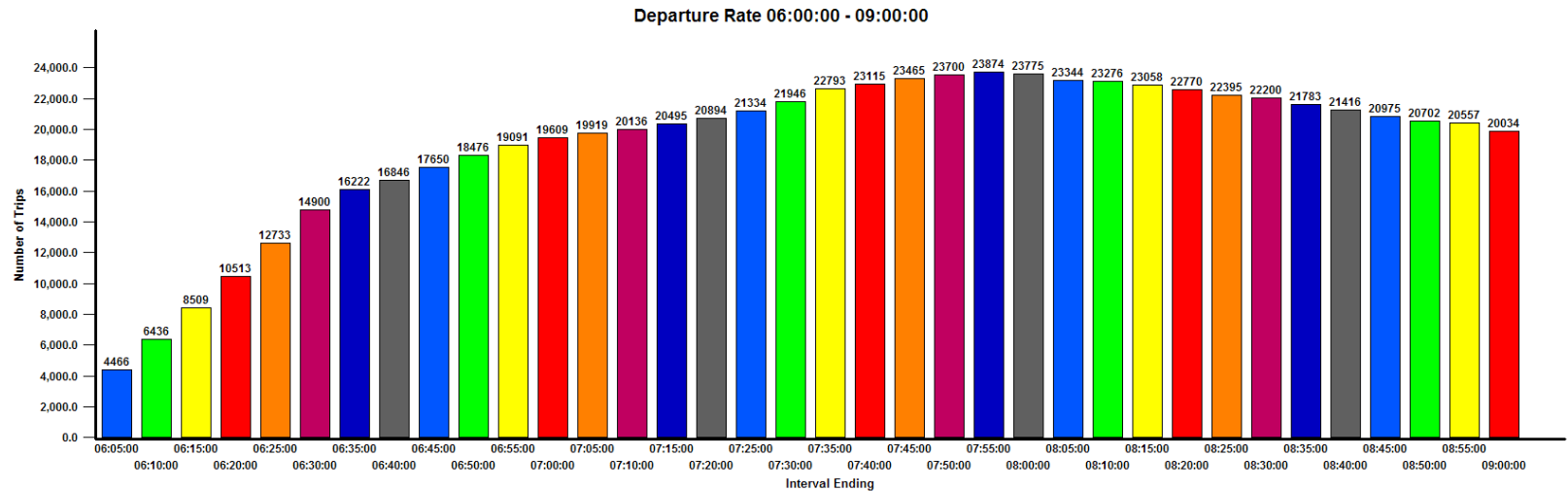


# Calibration/OD Estimation Results

Dataview2 - RMSE

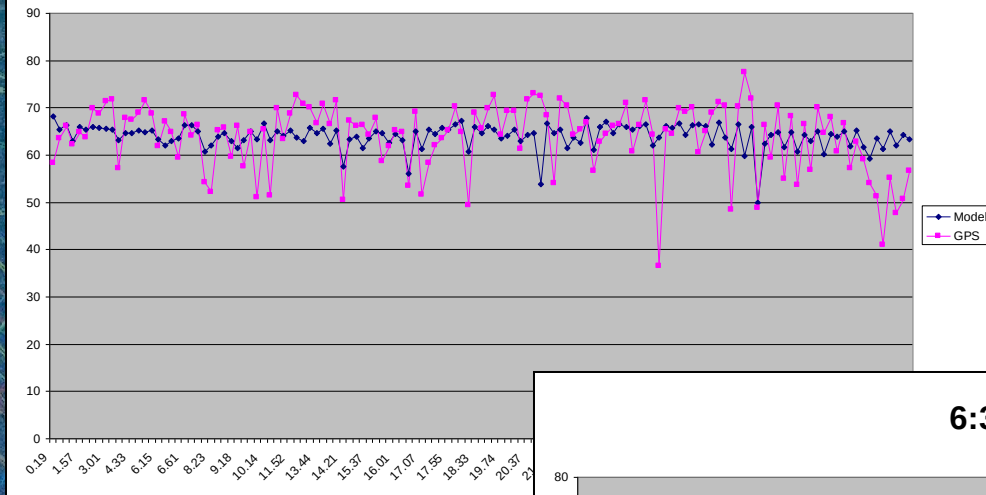
| Selection | Observations | RMSE  | [Sum of Count] | [Sum of Flows] | [% Flow/Count] |
|-----------|--------------|-------|----------------|----------------|----------------|
| 15        | 131          | 12.48 | 2502235.33     | 2611938.26     | 4.38           |
| 1405      | 46           | 18.09 | 927124.00      | 1012010.61     | 9.16           |
| 57        | 44           | 2.87  | 858837.50      | 865345.14      | 0.76           |
| 55        | 48           | 9.74  | 734817.42      | 768435.49      | 4.58           |
| 91        | 39           | 7.86  | 684241.75      | 712151.90      | 4.08           |
| 22        | 37           | 8.87  | 546706.25      | 575166.14      | 5.21           |

Chart1 - Trip Departure Histogram

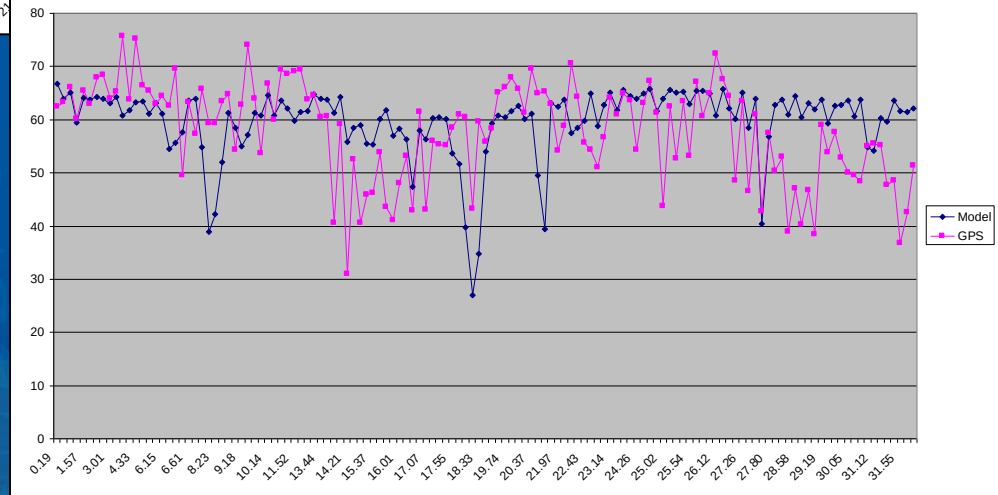


# Early Validation Results

6:00 - 6:30



6:30 - 7:00

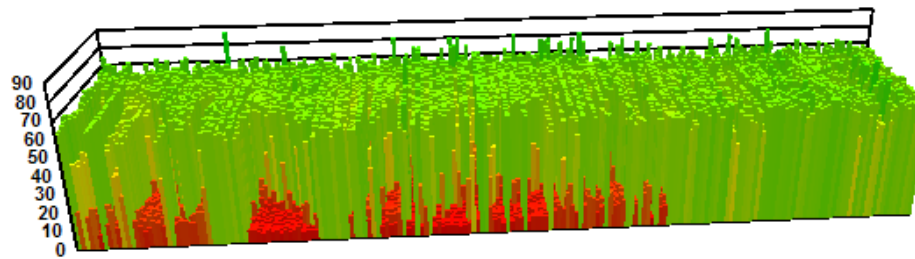


# Model Results: Time-Space Plots

Prism Map1 - Northbound Segment Statistics

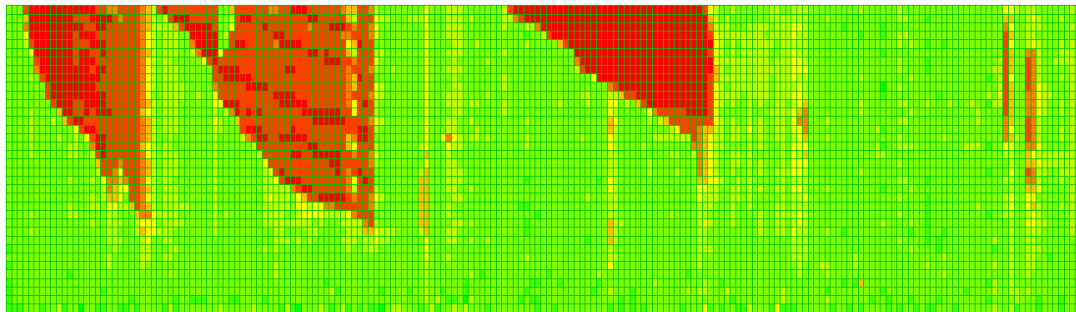


## Average Speed (mph)

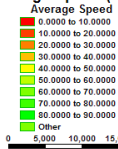


Average Segment Speeds Ordered by Milepost

TimeSpaceGrid.map - 15NB



### Average Speed (mph)

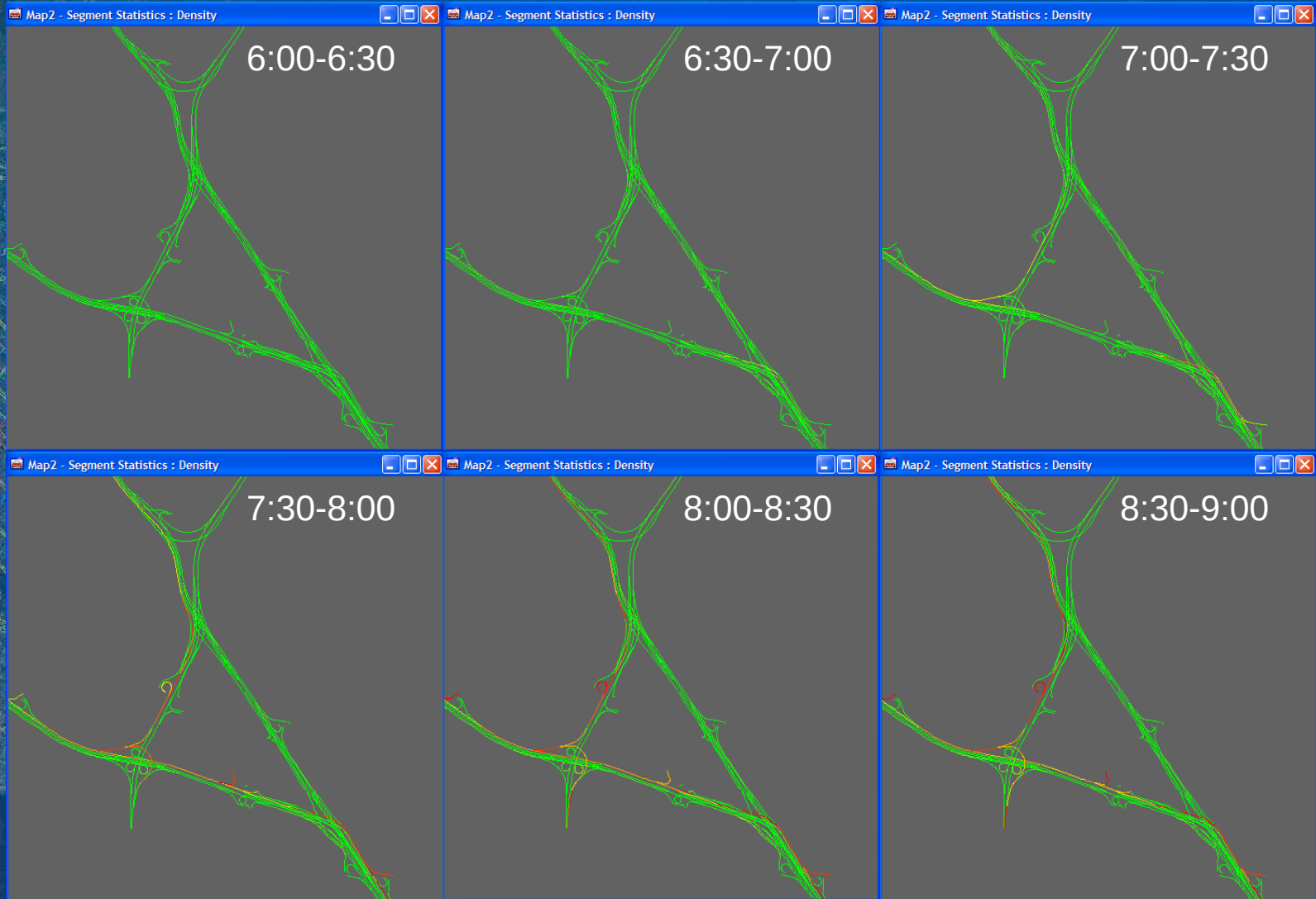


0 5,000 10,000 15,000

Meters

15 Northbound Ordered by Milepost

# Model Results: Dynamic Theme Maps



# Model Results: Text Reports

Simulation Project Initial w/o Ramp Meters Selection: Selection 12/05/08 19:56:24

## Point Type Sensor Report ( 6:00:00AM - 9:00:00AM)

| Sensor 3501    |               |                    |                           |                     |                       |
|----------------|---------------|--------------------|---------------------------|---------------------|-----------------------|
| Interval Time  | Vehicle Count | Flow (veh/hr/lane) | Avg Vehicle Occupancy (%) | Average Speed (mph) | Average Headway (sec) |
| 6:30:00AM      | 211           | 422.0              | 2.3                       | 72.7                | 5.5                   |
| 7:00:00AM      | 874           | 1,748.0            | 11.3                      | 59.5                | 2.0                   |
| 7:30:00AM      | 876           | 1,752.0            | 9.3                       | 61.5                | 2.0                   |
| 8:00:00AM      | 886           | 1,772.0            | 8.3                       | 66.1                | 2.0                   |
| 8:30:00AM      | 872           | 1,744.0            | 8.4                       | 65.7                | 2.0                   |
| 9:00:00AM      | 877           | 1,754.0            | 8.4                       | 65.2                | 2.0                   |
| <b>Summary</b> | <b>4596</b>   | <b>1,532.0</b>     | <b>8.0</b>                | <b>64.0</b>         | <b>2.2</b>            |
| Sensor 3502    |               |                    |                           |                     |                       |
| Interval Time  | Vehicle Count | Flow (veh/hr/lane) | Avg Vehicle Occupancy (%) | Average Speed (mph) | Average Headway (sec) |
| 6:30:00AM      | 177           | 354.0              | 2.3                       | 74.5                | 4.0                   |
| 7:00:00AM      | 877           | 1,754.0            | 11.0                      | 59.2                | 2.0                   |
| 7:30:00AM      | 887           | 1,774.0            | 9.6                       | 60.1                | 2.0                   |
| 8:00:00AM      | 878           | 1,756.0            | 8.2                       | 66.6                | 2.0                   |
| 8:30:00AM      | 868           | 1,736.0            | 8.1                       | 66.6                | 2.0                   |
| 9:00:00AM      | 878           | 1,756.0            | 8.5                       | 65.8                | 2.0                   |
| <b>Summary</b> | <b>4565</b>   | <b>1,521.7</b>     | <b>8.0</b>                | <b>64.1</b>         | <b>2.1</b>            |
| Sensor 3503    |               |                    |                           |                     |                       |
| Interval Time  | Vehicle Count | Flow (veh/hr/lane) | Avg Vehicle Occupancy (%) | Average Speed (mph) | Average Headway (sec) |
| 6:30:00AM      | 325           | 650.0              | 3.9                       | 67.3                | 3.9                   |
| 7:00:00AM      | 940           | 1,880.0            | 11.7                      | 56.2                | 1.9                   |
| 7:30:00AM      | 913           | 1,826.0            | 10.3                      | 58.3                | 2.0                   |
| 8:00:00AM      | 906           | 1,812.0            | 9.3                       | 62.6                | 2.0                   |
| 8:30:00AM      | 910           | 1,820.0            | 9.2                       | 63.6                | 1.9                   |
| 9:00:00AM      | 885           | 1,770.0            | 9.0                       | 62.6                | 2.0                   |
| <b>Summary</b> | <b>4879</b>   | <b>1,626.3</b>     | <b>8.9</b>                | <b>61.1</b>         | <b>2.1</b>            |

Simulation Project

Initial w/o Ramp Meters  
Selection: Instant Report

12/05/08 19:56:24

## Segment Speed, Flow and Density Report ( 6:00:00AM - 9:00:00AM)

| Segment 6712337 (SAN DIEGO FWY, NWB) |                |                   |                                      |                               |
|--------------------------------------|----------------|-------------------|--------------------------------------|-------------------------------|
| Interval Ending                      | Flow (vph)     | Avg Speed (mi/hr) | Std. Dev. Speed (mi/hr) <sup>2</sup> | Average Density (veh/mi/lane) |
| 6:30:00AM                            | 2,194.0        | 66.4              | 9.28                                 | 7.4                           |
| 7:00:00AM                            | 7,326.0        | 52.6              | 12.45                                | 29.2                          |
| 7:30:00AM                            | 6,706.0        | 18.0              | 8.80                                 | 75.9                          |
| 8:00:00AM                            | 6,824.0        | 17.8              | 13.08                                | 77.9                          |
| 8:30:00AM                            | 6,964.0        | 23.1              | 12.16                                | 60.7                          |
| 9:00:00AM                            | 7,270.0        | 29.2              | 14.81                                | 50.6                          |
| <b>Summary</b>                       | <b>6,214.0</b> | <b>25.4</b>       | <b>17.10</b>                         | <b>50.3</b>                   |

Simulation Project

Initial w/o Ramp Meters  
Selection: I5 NB Mainline w GPS

12/05/08 19:56:24

## Segment Travel Time Report ( 6:00:00AM - 9:00:00AM)

| Segment 6668044 (SANTA ANA FWY, NWB) |                    |                         |                               |                                              |
|--------------------------------------|--------------------|-------------------------|-------------------------------|----------------------------------------------|
| Interval Ending                      | Number of Vehicles | Total Travel Time (min) | Average Travel Time (sec/veh) | Std. Dev. of Travel Time (sec <sup>2</sup> ) |
| 6:30:00AM                            | 794                | 26.6                    | 2.0                           | 0.3                                          |
| 7:00:00AM                            | 2,879              | 99.1                    | 2.1                           | 0.3                                          |
| 7:30:00AM                            | 3,525              | 139.9                   | 2.4                           | 0.4                                          |
| 8:00:00AM                            | 3,085              | 139.1                   | 2.7                           | 0.7                                          |
| 8:30:00AM                            | 2,046              | 106.4                   | 3.1                           | 1.1                                          |
| 9:00:00AM                            | 1,889              | 83.9                    | 2.7                           | 0.8                                          |
| <b>Summary</b>                       | <b>14,218</b>      | <b>595.1</b>            | <b>2.5</b>                    | <b>0.8</b>                                   |
| Segment 6668090 (SAN DIEGO FWY, NWB) |                    |                         |                               |                                              |
| Interval Ending                      | Number of Vehicles | Total Travel Time (min) | Average Travel Time (sec/veh) | Std. Dev. of Travel Time (sec <sup>2</sup> ) |
| 6:30:00AM                            | 1,312              | 236.4                   | 10.8                          | 1.1                                          |
| 7:00:00AM                            | 3,844              | 830.2                   | 13.0                          | 2.3                                          |
| 7:30:00AM                            | 3,743              | 809.8                   | 13.0                          | 2.5                                          |
| 8:00:00AM                            | 3,763              | 847.8                   | 13.5                          | 2.2                                          |
| 8:30:00AM                            | 3,799              | 886.5                   | 14.0                          | 3.1                                          |
| 9:00:00AM                            | 3,890              | 900.5                   | 13.9                          | 2.6                                          |
| <b>Summary</b>                       | <b>20,351</b>      | <b>4511.1</b>           | <b>13.3</b>                   | <b>2.6</b>                                   |

# Scenarios

- **Alternative Interchange Design at SR-74 & I5**
- **Added Ramp Storage on Northbound ramps at Alicia Pkwy & Oso Pkwy**
- **Roundabout at Junipero Serra, NB I-5 Ramps & Rancho Viejo Rd**
- **57 Widening**
- **91 Widening + Added 55 Connector Auxiliary Lane (as yet uncoded)**

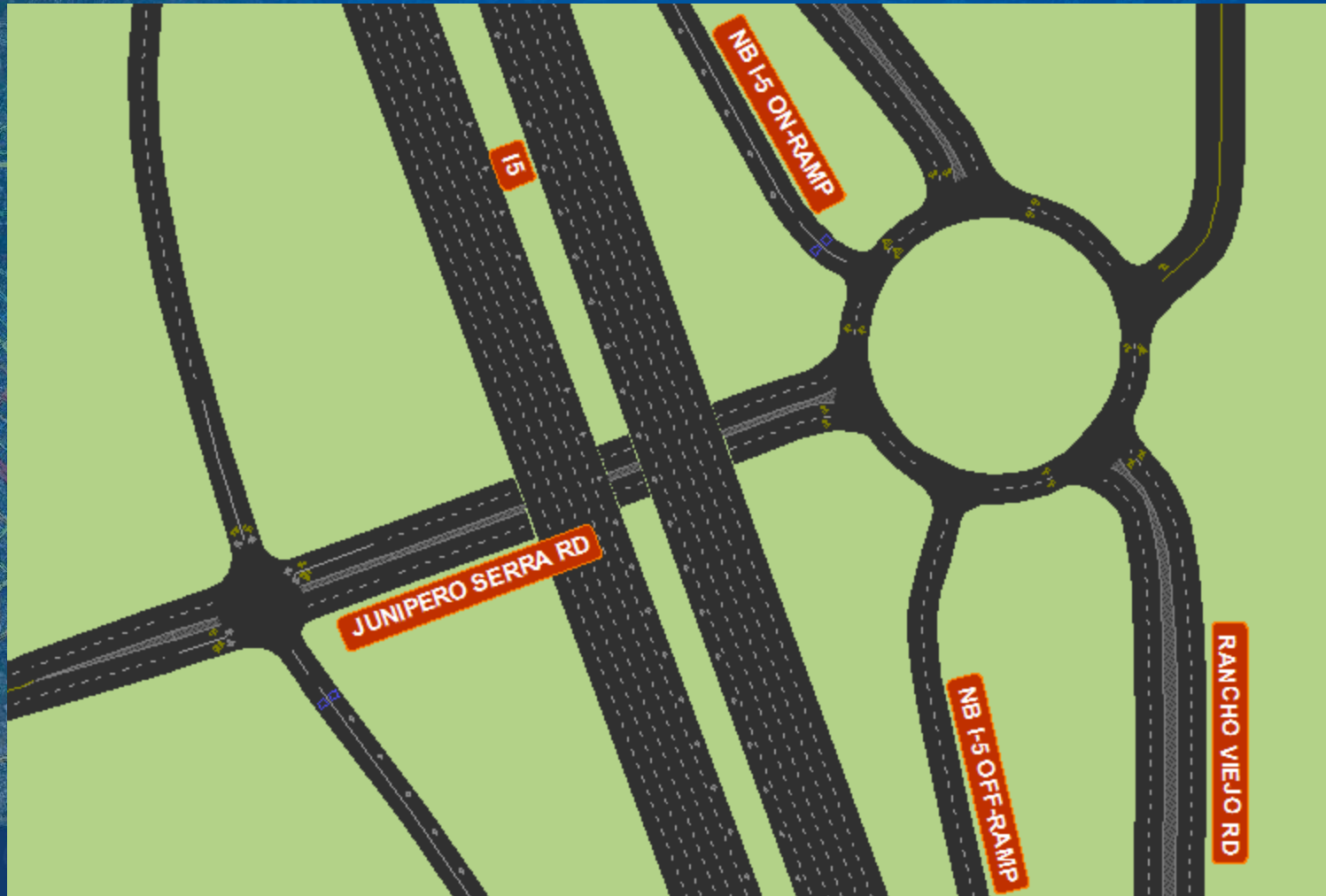
# Alternative SR-74 Interchange Designs

Present Day

Alternative 3

Alternative 5

# Roundabout at Junipero Serra



# Future Work

- **PM Model Calibration & Validation**
- **Incorporation of Arterial Counts and Signal Timings**
- **Additional Scenarios**
- **Additional Applications under R & D**