

# **Use of TRANSIMS to Analyze Large-Scale Land-Use Changes: Status Update**

Presented to TRANSIMS Applications and  
Development Workshop

April 9, 2010

by John Kerenyi, P.E., Senior Engineer,  
City of Moreno Valley

# Context for Research Question

- MoVal currently processing over 5 million square feet of high-cube warehouse development applications  
*(all GP amendments therefore discretionary)*
- Potential for 4,700 acres to be converted  
(over 50 million square feet)
  - Approximately 25,000 daily truck trips

*Moreno Valley's  
Undeveloped East End  
As Seen in Google Earth*

Image © 2008 DigitalGlobe  
© 2008 Tele Atlas

© 2008 Europa Technologies  
elev 528 m

©2008 Google

33°56'09.87" N 117°08'57.64" W

2006

Eye alt 1.02 km

*Ontario's Industrial Area*  
*As Seen in Google Earth*

Image © 2008 DigitalGlobe  
© 2008 Tele Atlas

Google

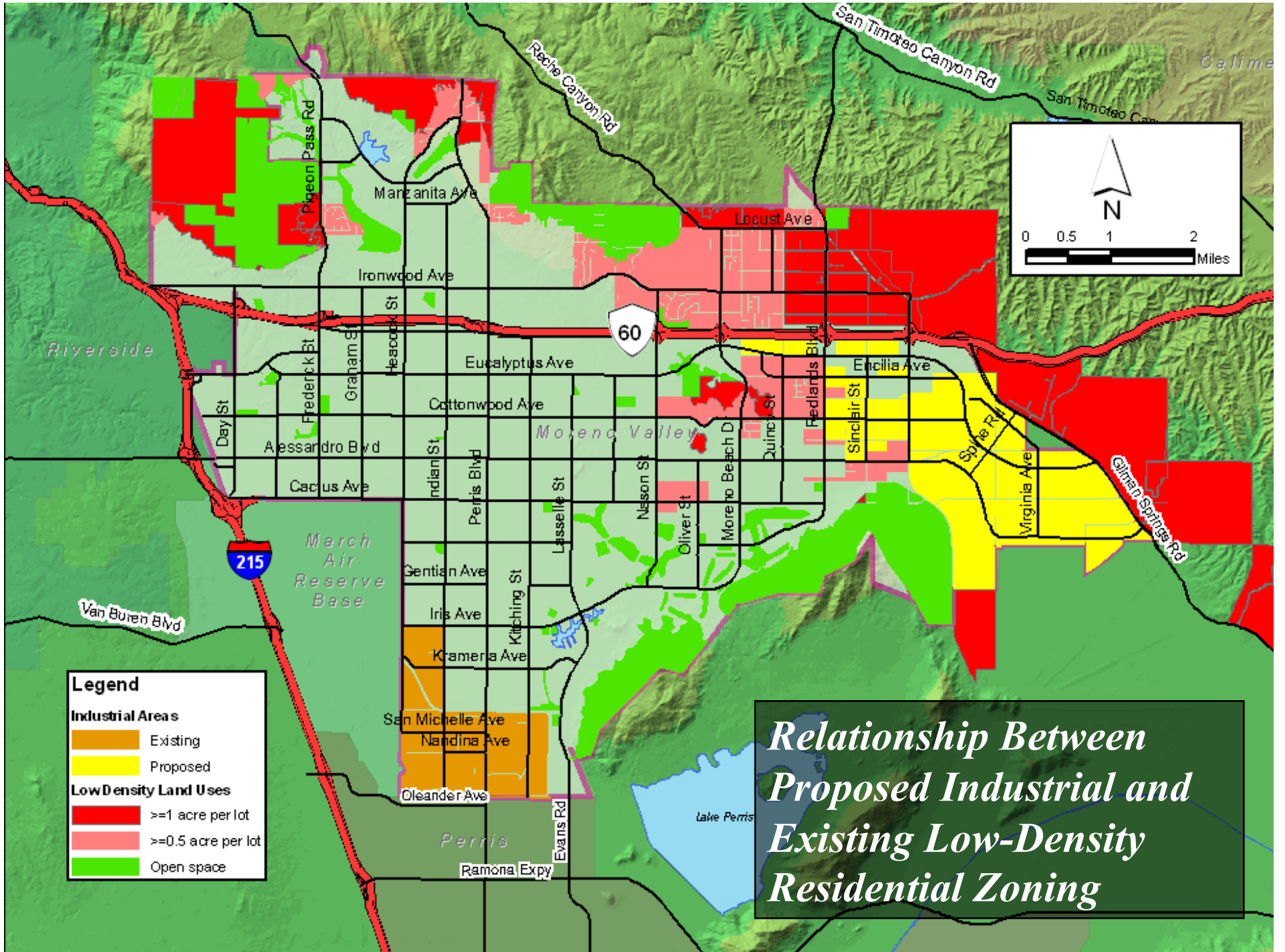
34°01'00.86" N 117°32'35.90" W

elev 239 m

Oct 23, 2007

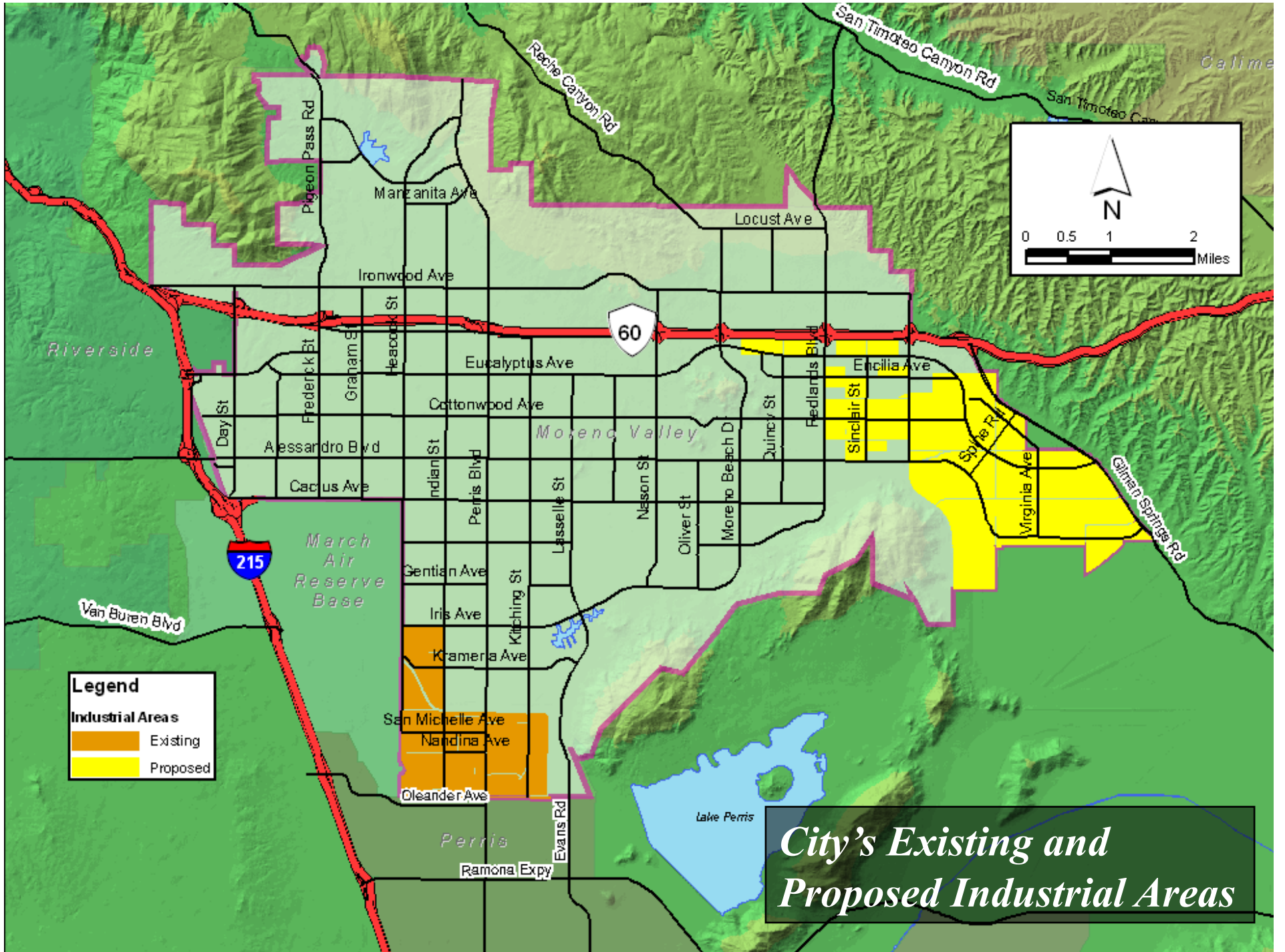
Eye alt 748 m





# Impacts of Industrial Land Uses/ Problem Statement

- Road capacity
- Road cross-section
- Freeway interchanges
- Routing of traffic esp. to the City's existing industrial area



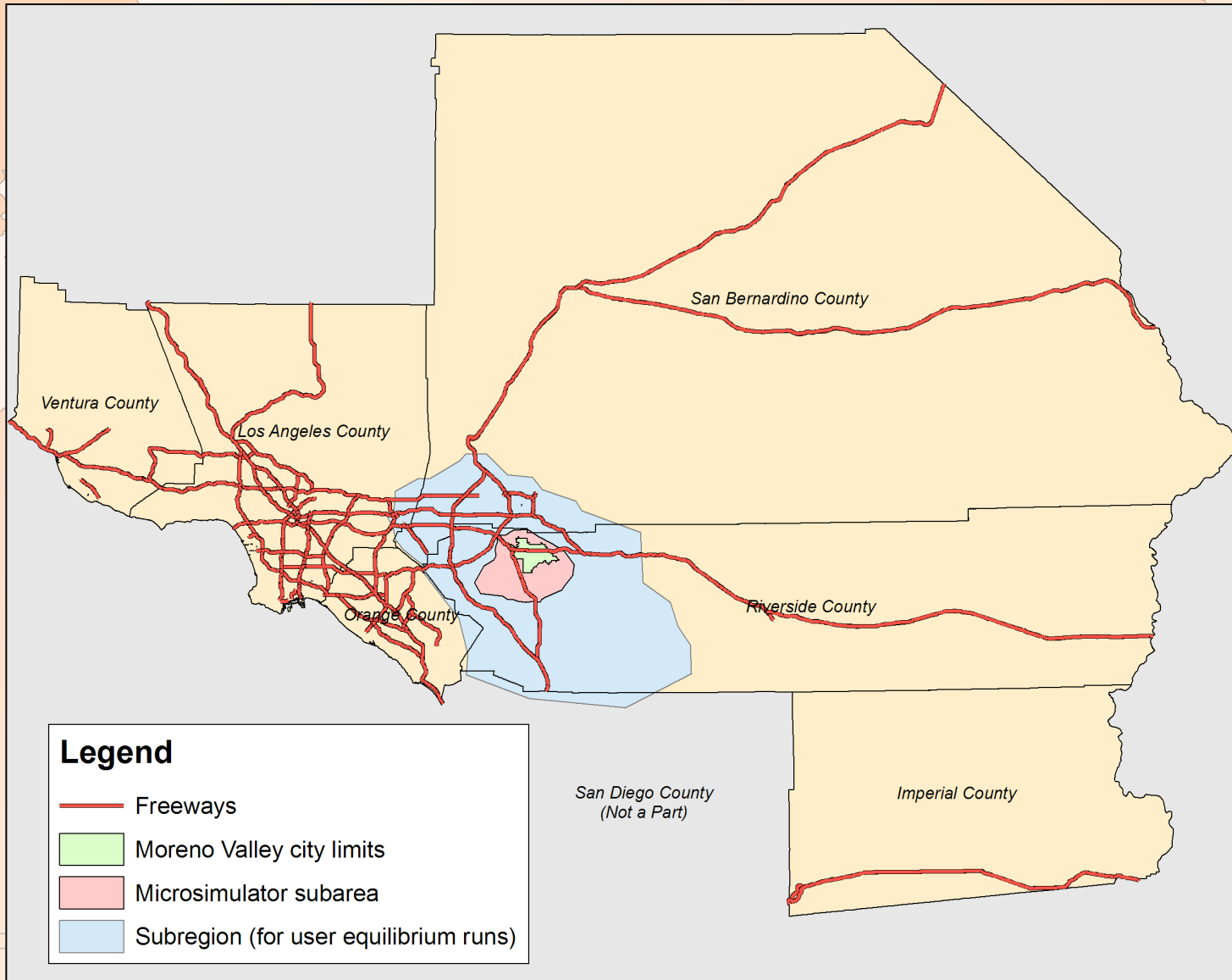
*City's Existing and Proposed Industrial Areas*



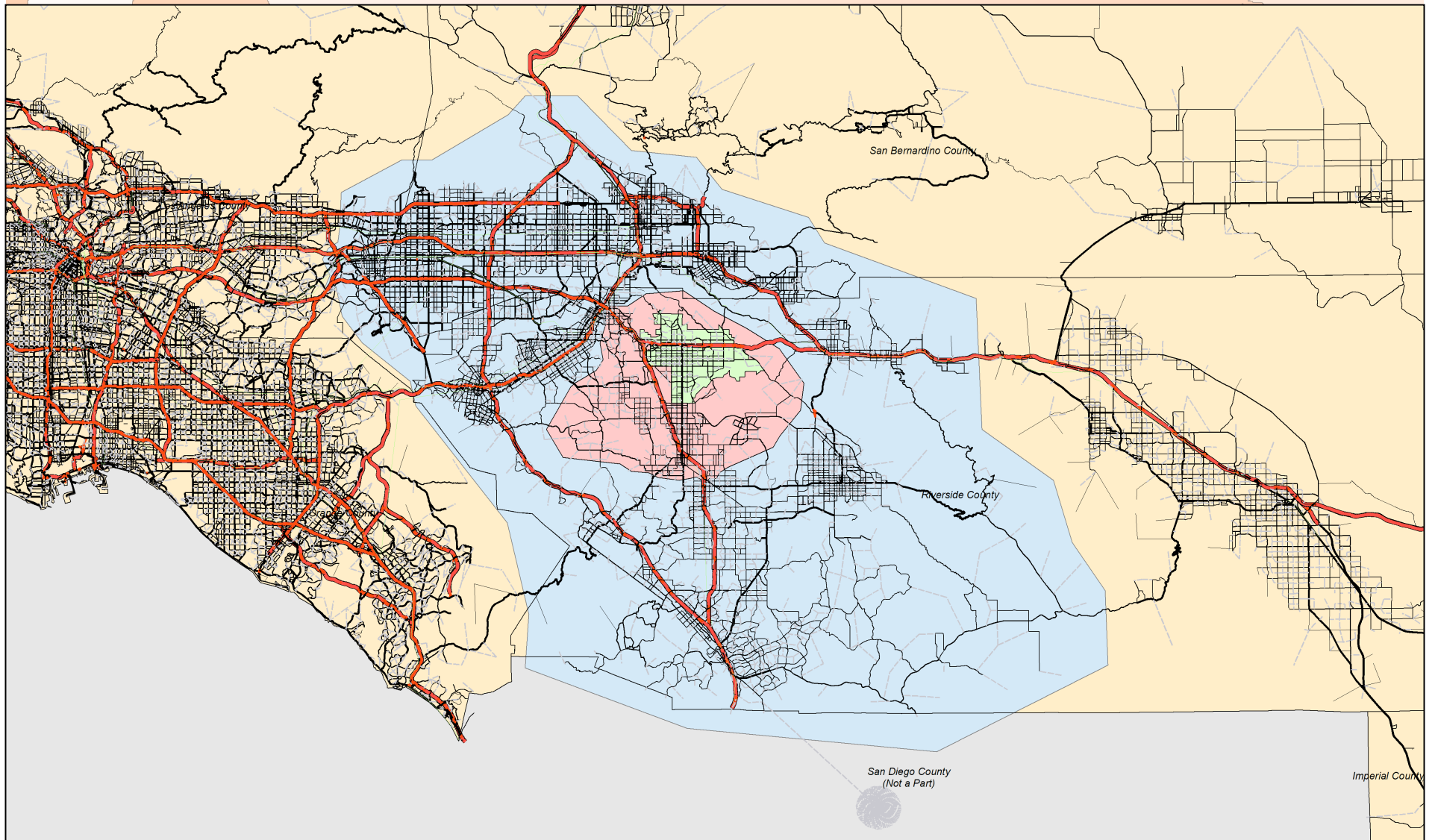
# Data Conversion Overview



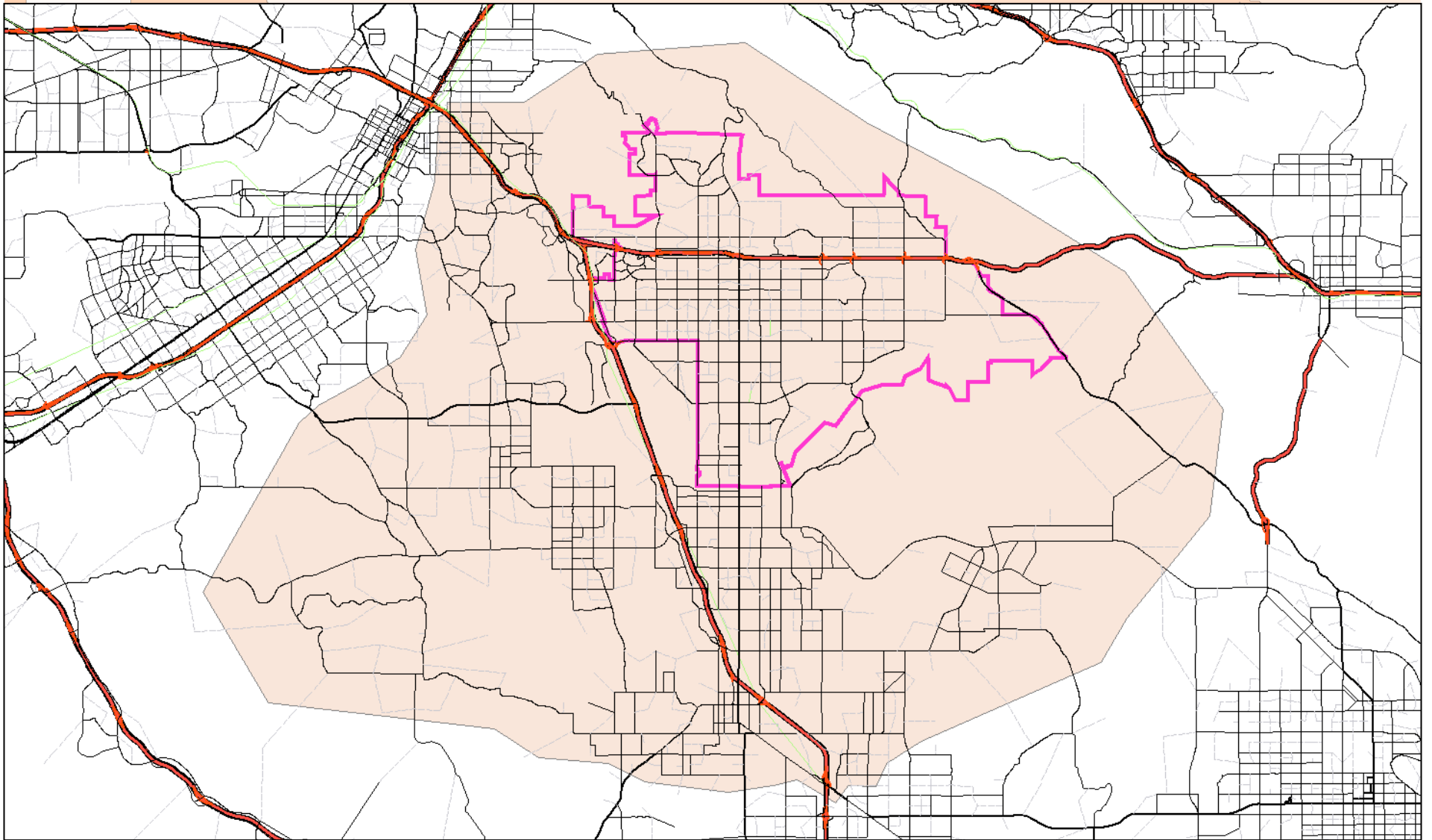
# SCAG Region



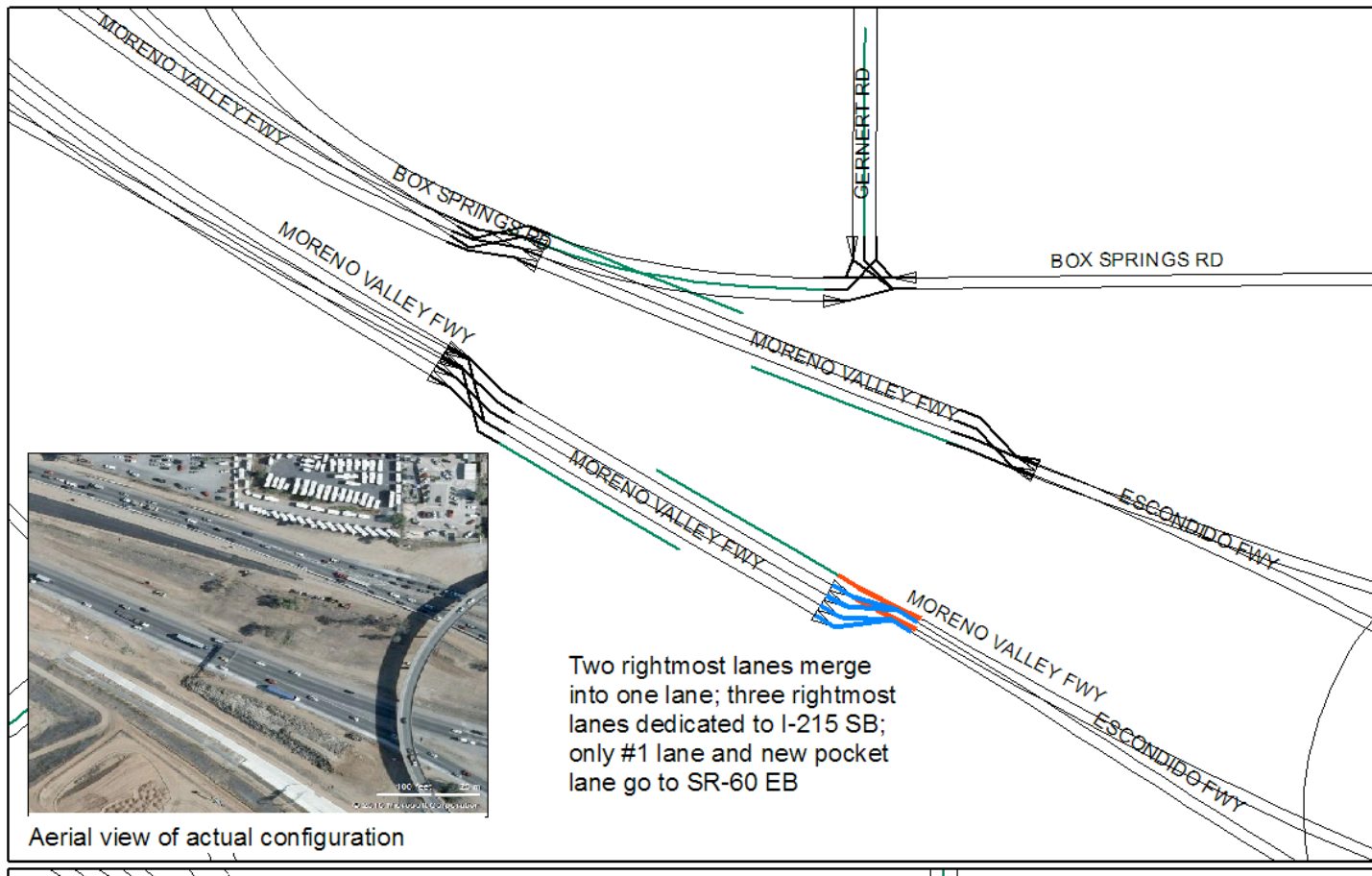
# Subregion



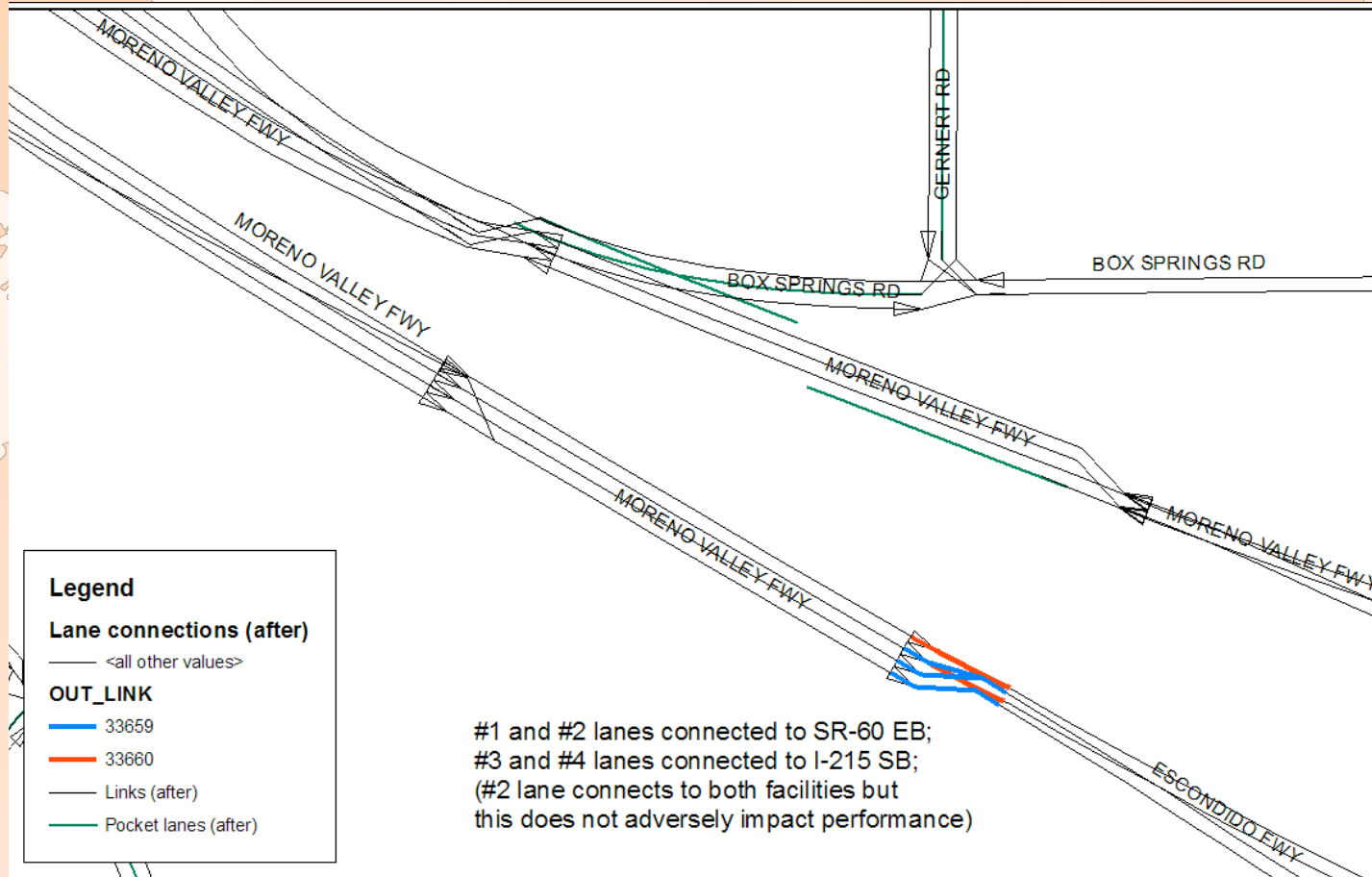
# Microsimulated Subarea



# Lane Connectivity Issue



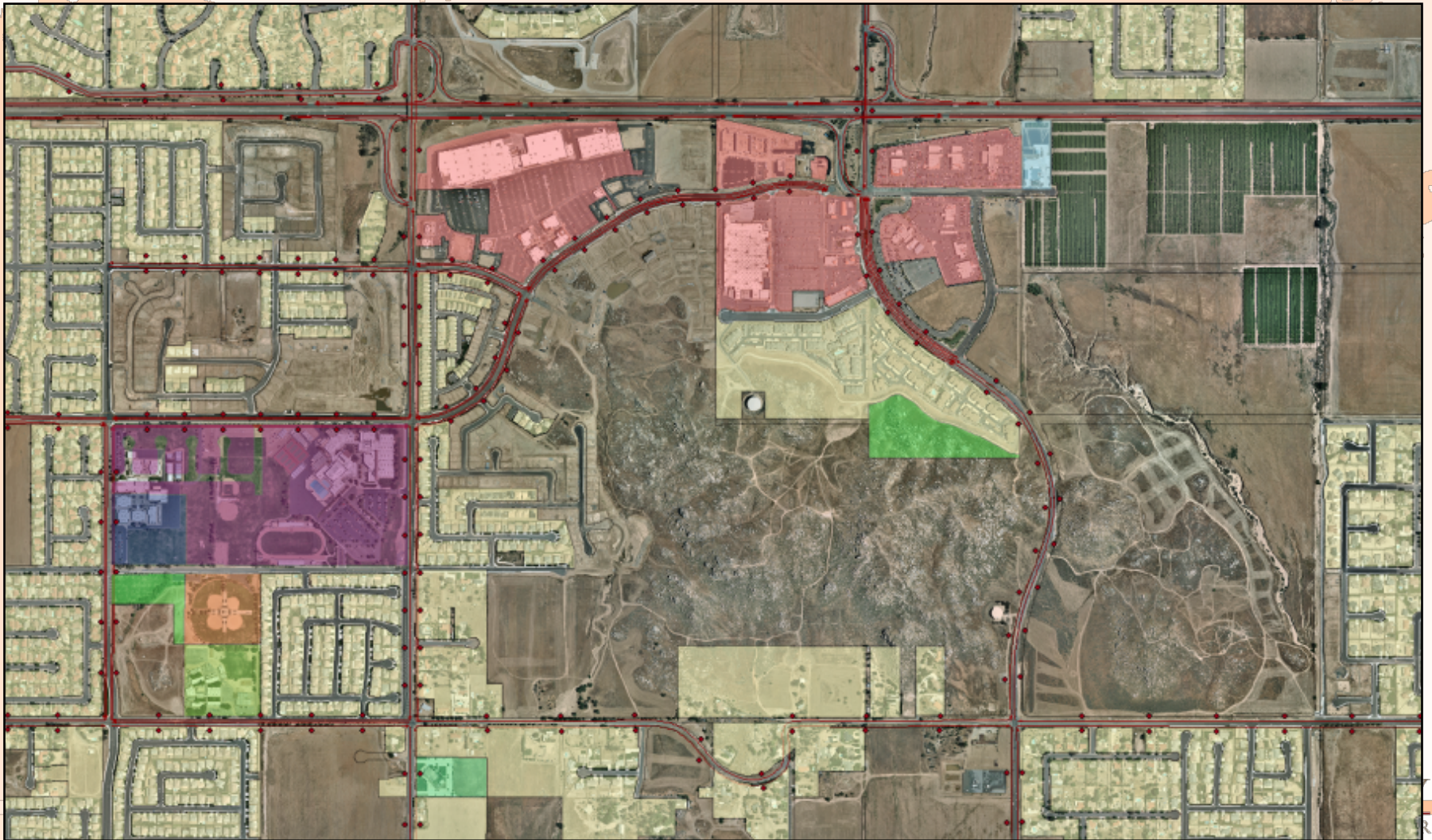
# Lane Connectivity Fix



# Commercial/Residential Traffic



# Commercial/Residential Traffic



# Example of LocationData Use 1



**Example 1:** Home-Based Work trip from Production to Attraction Starting in Moreno Valley, Ending Elsewhere

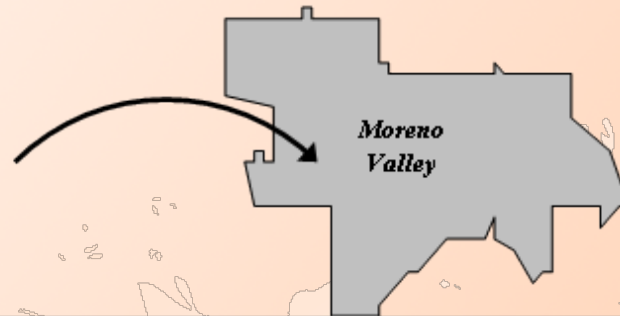
| Stage        | Origin  | Destination             |
|--------------|---|-------------------------|
| LocationData | RES=1<br>NON_RES=0                                      | RES=1<br>NON_RES=1      |
| ConvertTrips | ORIGIN_WT_FIELD=RES=1                                   | DEST_WT_FIELD=NON_RES=1 |
| Result       | Trip constrained to start in residential portion of TAZ | Trip not constrained    |



**MORENO VALLEY**  
WHERE DREAMS SOAR



# Example of LocationData Use



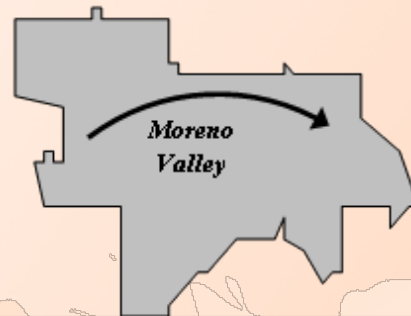
**Example 2:** Home-Based Work trip from Production to Attraction Starting Elsewhere, Ending in Moreno Valley

| Stage        | Origin                | Destination   |
|--------------|-----------------------|---|
| LocationData | RES=1<br>NON RES=1    | RES=0<br>NON RES=1  |
| ConvertTrips | ORIGIN_WT_FIELD=RES=1 | DEST_WT_FIELD=NON_RES=1                                   |
| Result       | Trip not constrained  | Trip constrained to end in non-residential portion of TAZ |



**MORENO VALLEY**  
WHERE DREAMS SOAR

# Example of LocationData Use



**Example 3:** Home-Based Work trip from Production to Attraction with Both Ends in Moreno Valley

| Stage        | Origin  | Destination   |
|--------------|---|---|
| LocationData | RES=1<br>NON RES=0                                      | RES=0<br>NON RES=1  |
| ConvertTrips | ORIGIN_WT_FIELD=RES=1                                   | DEST_WT_FIELD=NON_RES=1                                   |
| Result       | Trip constrained to start in residential portion of TAZ | Trip constrained to end in non-residential portion of TAZ |



**MORENO VALLEY**  
WHERE DREAMS SOAR

# Example of LocationData Use



**Example 4:** Home-Based Work trip from Production to Attraction Starting and Ending Outside Moreno Valley

| Stage        | Origin                | Destination             |
|--------------|-----------------------|-------------------------|
| LocationData | RES=1<br>NON RES=1    | RES=1<br>NON RES=1      |
| ConvertTrips | ORIGIN_WT_FIELD=RES=1 | DEST_WT_FIELD=NON_RES=1 |
| Result       | Trip not constrained  | Trip not constrained    |

# Example of LocationData Use

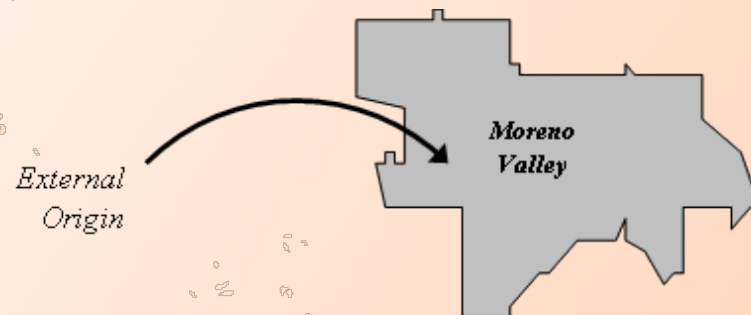


**Example 5: Truck Trip Starting in Moreno Valley, Ending Elsewhere**

| Stage        | Origin  | Destination             |
|--------------|---|-------------------------|
| LocationData | RES=0<br>NON_RES=1  | RES=1<br>NON_RES=1      |
| ConvertTrips | ORIGIN_WT_FIELD=NON_RES=1                                   | DEST_WT_FIELD=NON_RES=1 |
| Result       | Trip constrained to start in non-residential portion of TAZ | Trip not constrained    |



# Example of LocationData Use



**Example 6: External Trip Ending in Moreno Valley**

| Stage        | Origin                           | Destination                      |
|--------------|----------------------------------|----------------------------------|
| LocationData | RES=1<br>NON_RES=1<br>ALWAYS_1=1 | RES=0<br>NON_RES=1<br>ALWAYS_1=1 |
| ConvertTrips | ORIGIN_WT_FIELD<br>=ALWAYS_1=1   | DEST_WT_FIELD<br>=ALWAYS_1=1     |
| Result       | Trip not constrained             | Trip not constrained             |

Note: ALWAYS\_1 field has been omitted from the other examples for brevity but is set for all activity locations. It is only used for external trips and auto trips to/from special generators e.g. airports, Ports of Los Angeles/Long Beach.



# Router Stabilization



# Trip Constraints

- Departure-constrained trips
  - Defined as beginning (departing) at a certain time
  - ConvertTrips sets start time and guesses end time
  - End time becomes irrelevant because whenever trip is completed it is removed from network
- Arrival-constrained trips
  - Defined as ending (arriving) at a certain time
  - ConvertTrips sets end time and guesses start time
  - Router starts trip at guessed start time
  - Resulting trip not likely to arrive at desired time



# Constraints Pros and Cons

- **Departure Time Pros**
  - Easy to simulate; trips always start on time
- **Departure Time Cons**
  - For inbound commute trips, one diurnal curve not sufficient; must adjust for short/long commutes

- **Arrival Time Pros**
  - Perfect for inbound commuters: can provide curve reflecting typical arrive-to-work times
  - Long commuters automatically started earlier
- **Arrival Time Cons**
  - Must feed back actual trip time





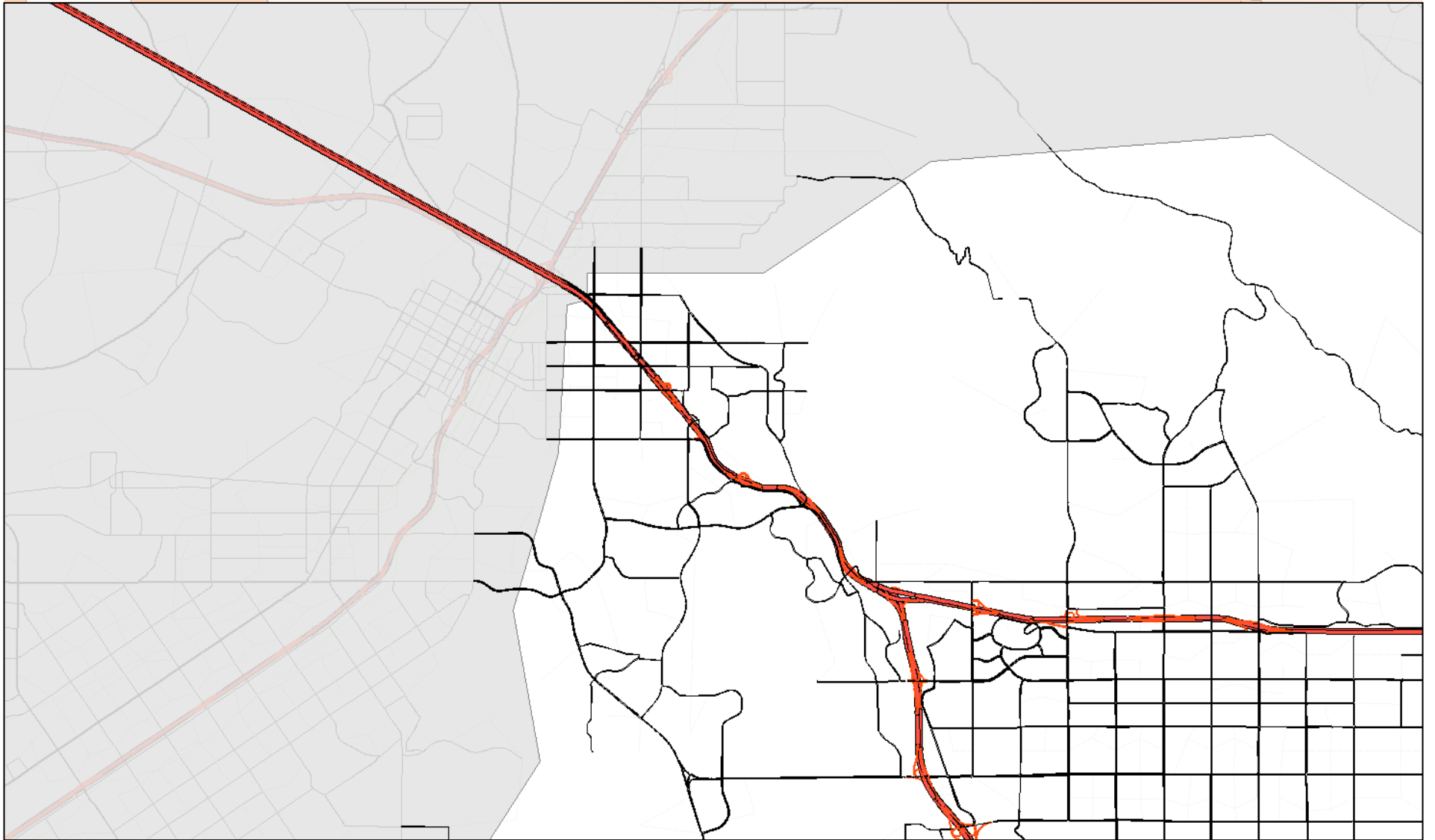
# Trip Start Time Updates

- PlanTrips program “uses the time constraints from the original trip file and the trip duration from the plan file to update the trip start and end times in the new trip file”
- Also can write a new plan file if desired; new plans are “slid” in time but keep same routes
- Outcome: New trip file with corrected start times, and new plan file to match

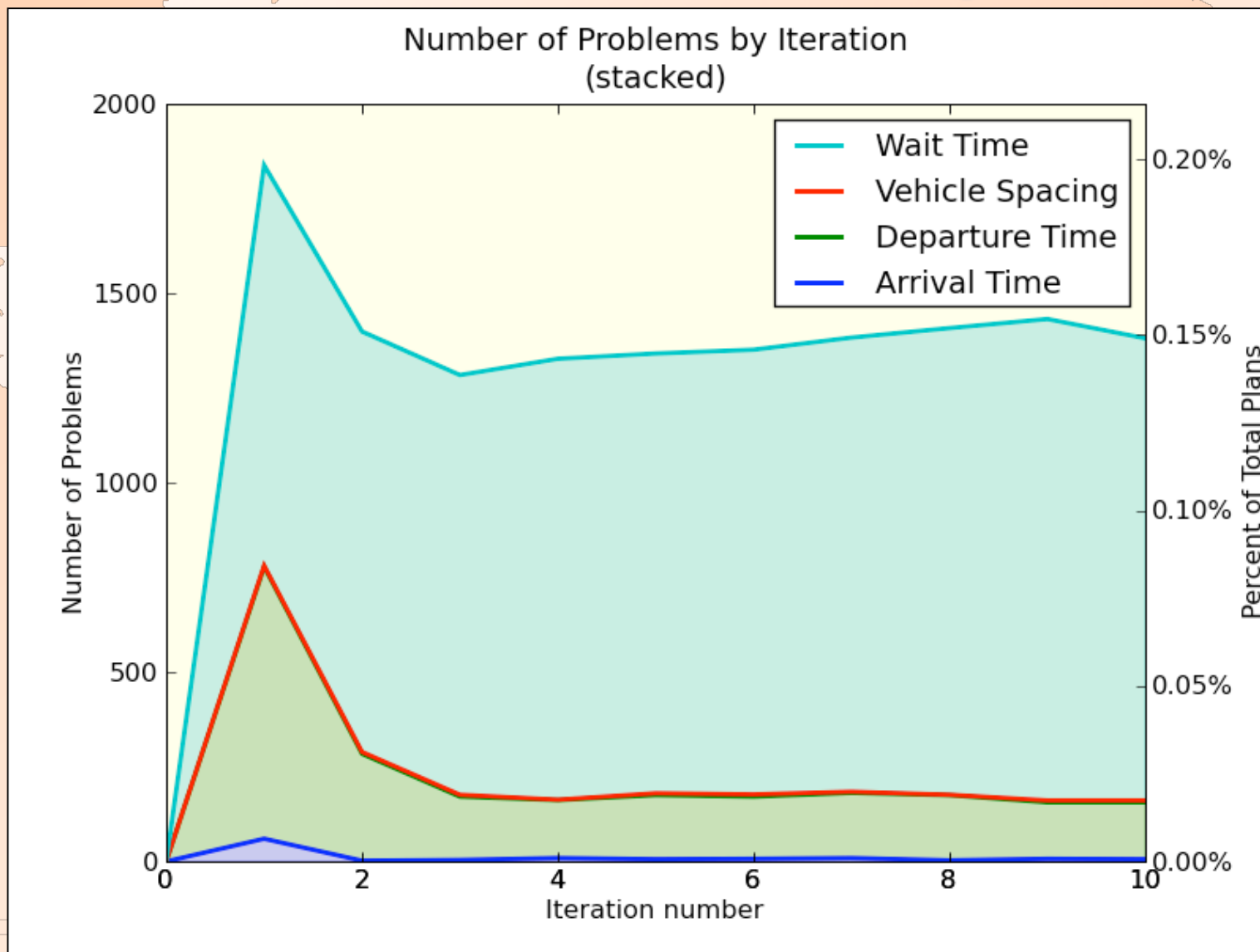


# Microsimulator Stabilization

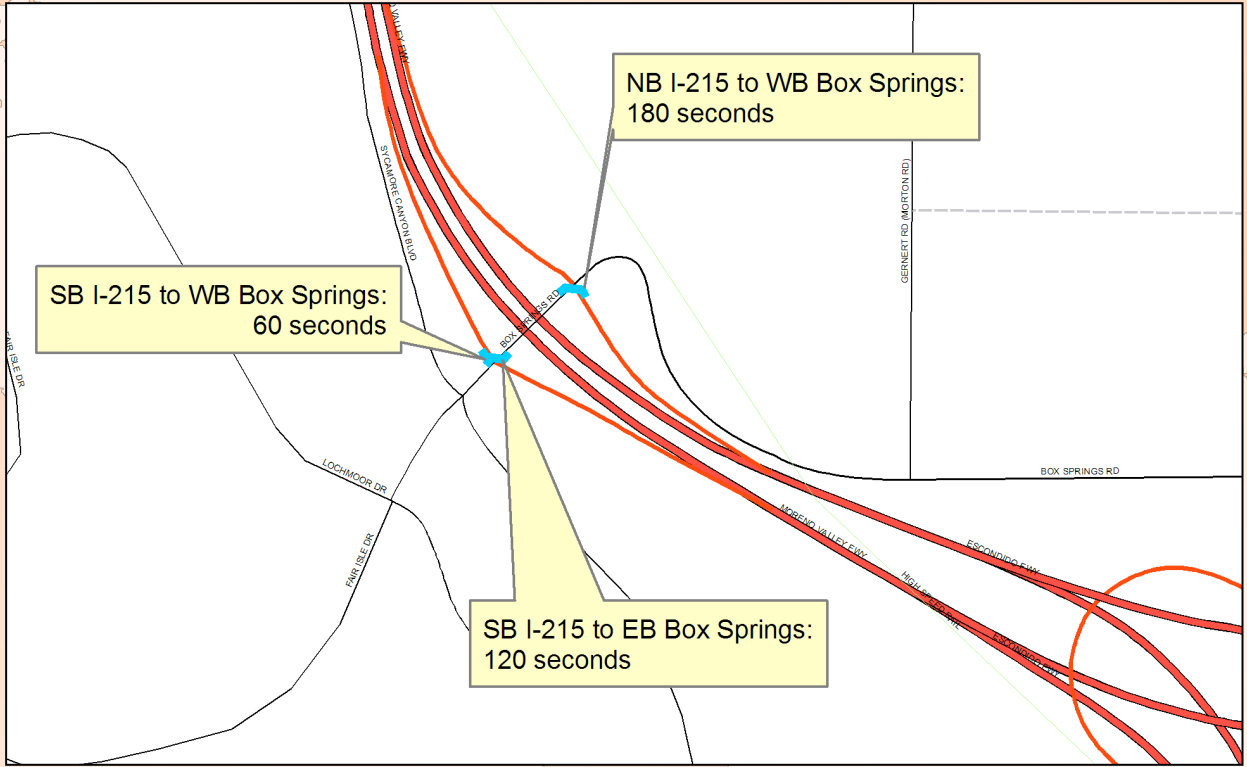
# Entry Link Extension

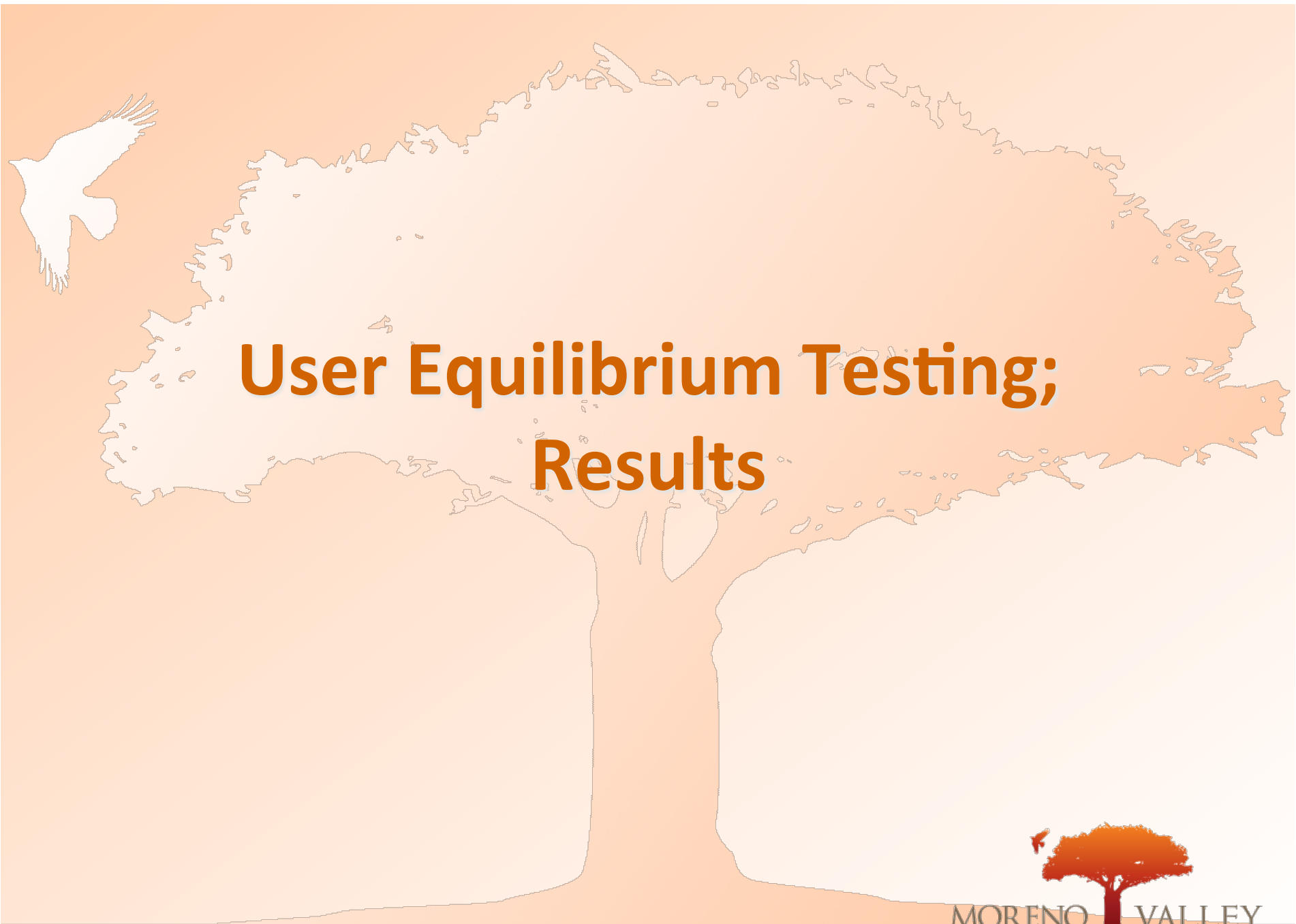


# Microsimulator Problems by Iteration



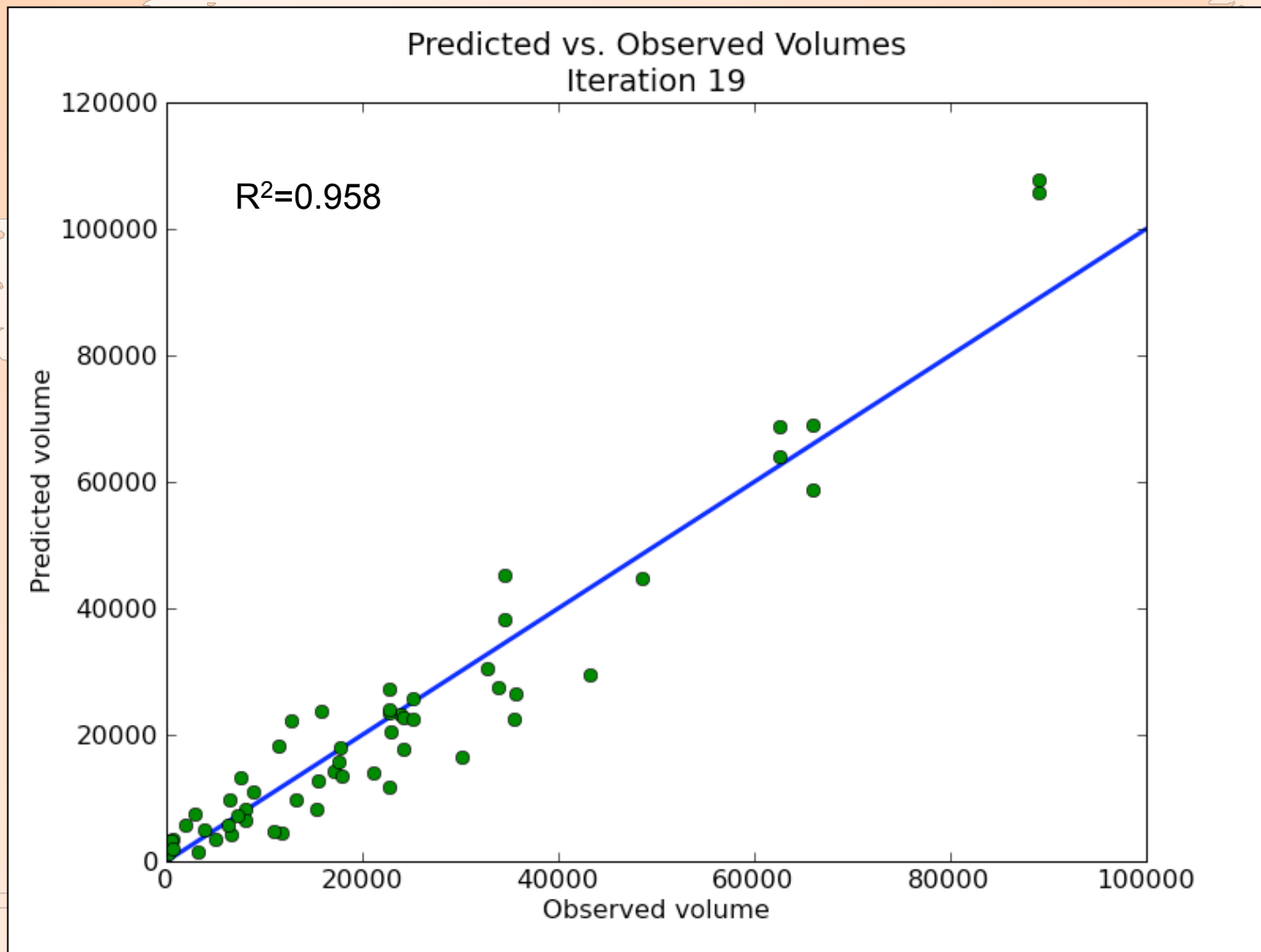
# Time Penalties at Box Springs Rd



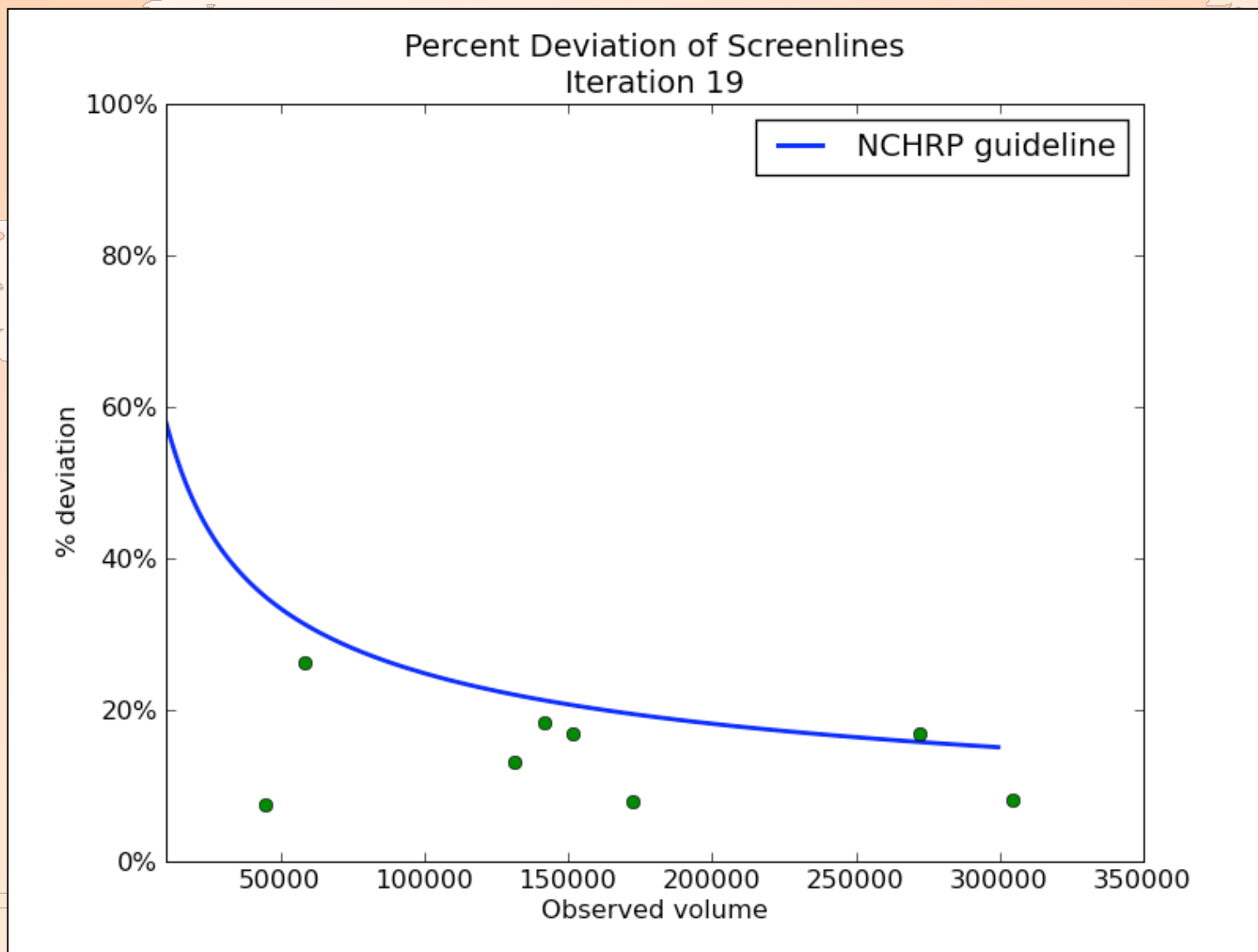


# User Equilibrium Testing; Results

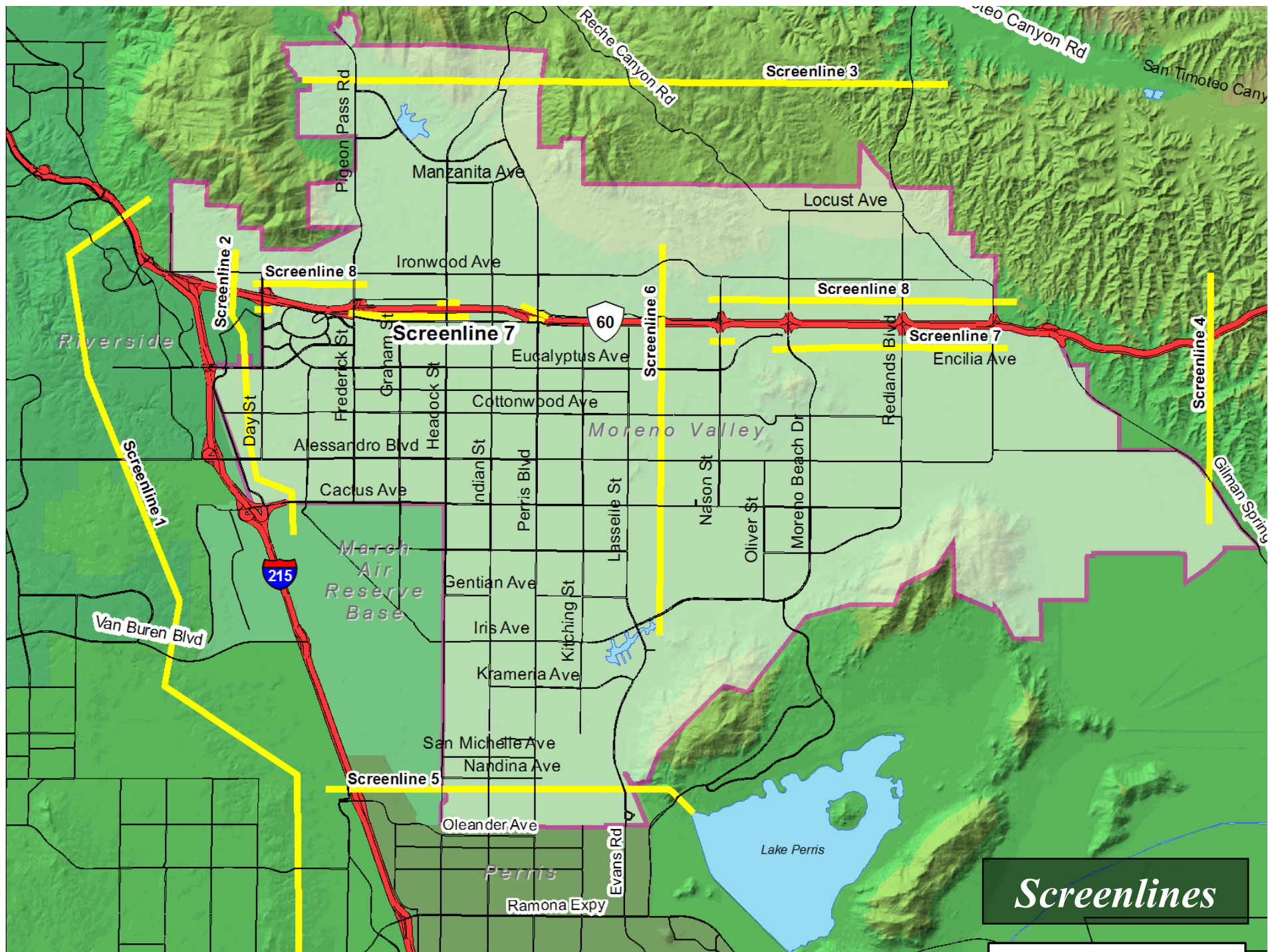
# Predicted vs. Observed Volumes



# Screenline Percent Deviation

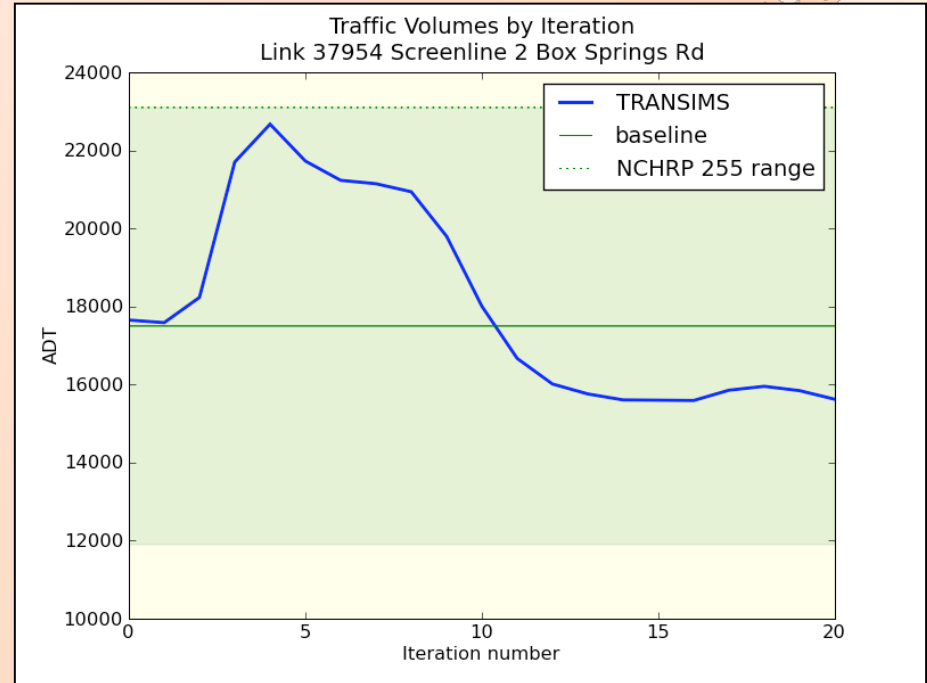
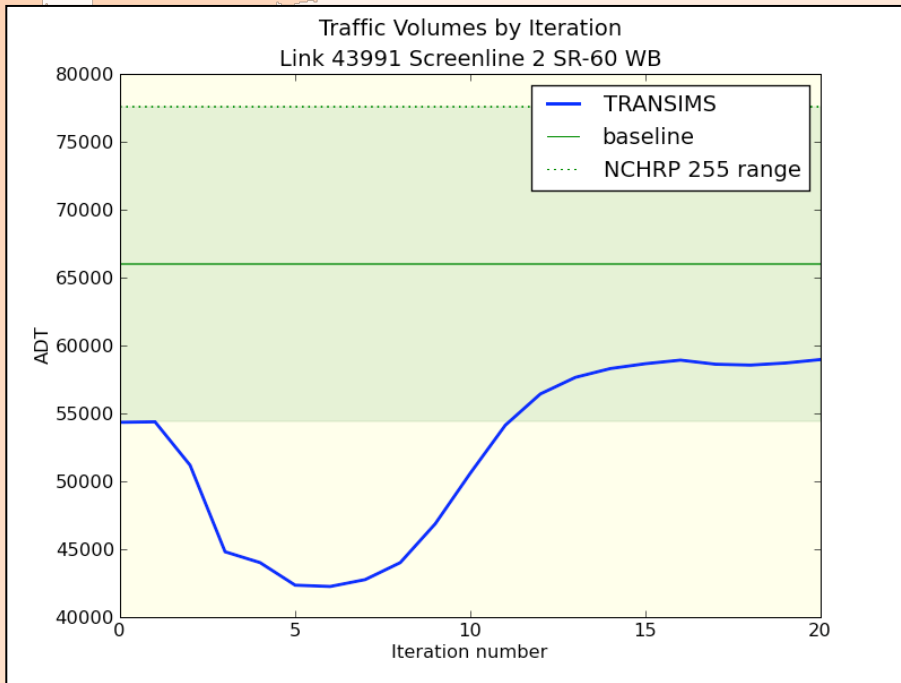




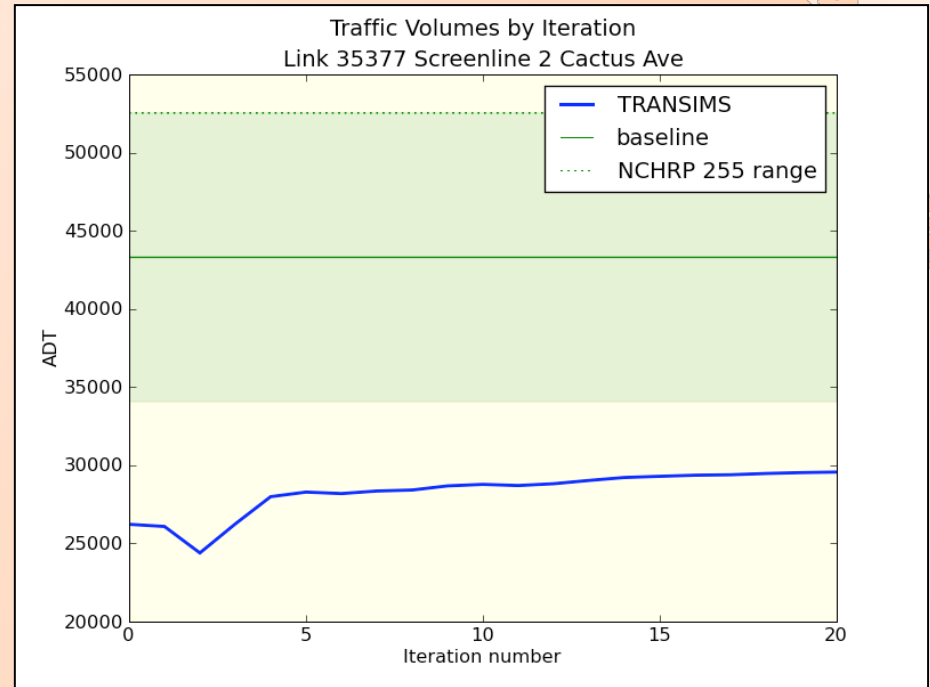
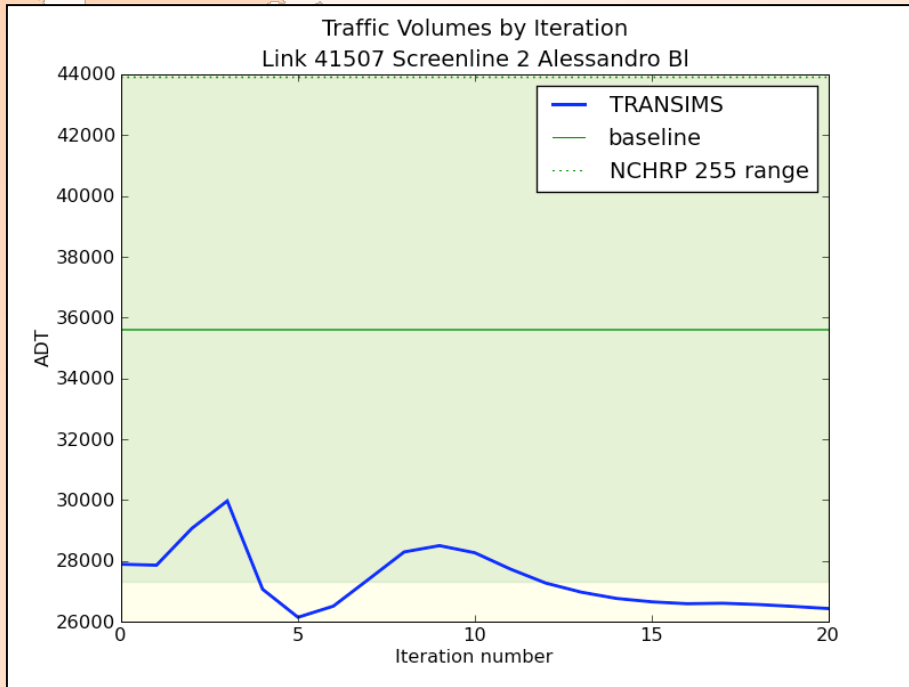


*Screenlines*

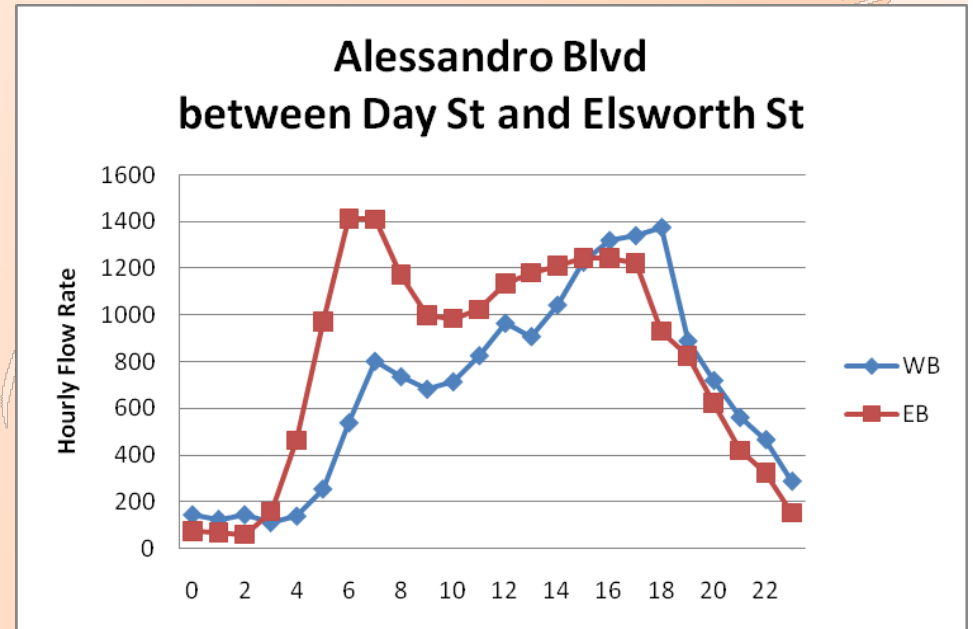
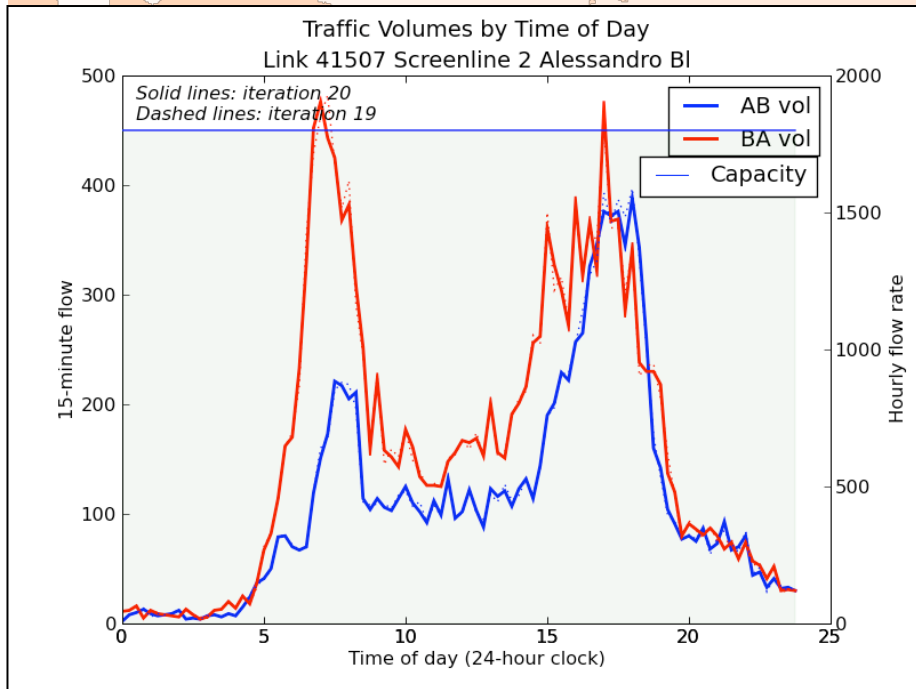
# Screenline 2



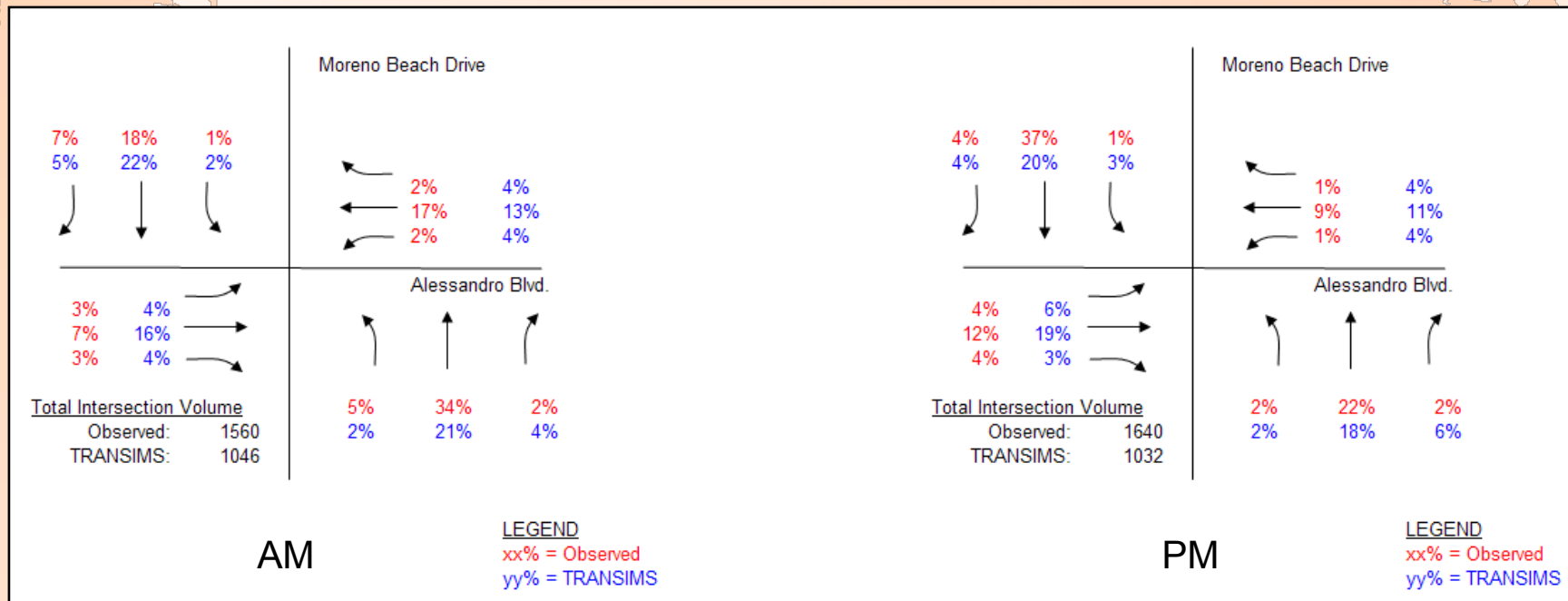
# Screenline 2



# Time Of Day Flows—Example



# Turning Movement Validation



# Next Steps

- Create Year 2035 trip tables and network; run model
- Augment network as necessary to achieve acceptable performance; this becomes the reference network
- Create Year 2035 Plus Project trip tables using TransCAD
- Run model; adjust network to achieve acceptable performance; document differences from reference network
- To analyze truck interactions, will need to roll up sleeves to understand SCAG's heavy-duty vehicle model