AGENDA

- New since Last Time
- Objectives
- Quality Control
- Existing Data
- Data Collection
- Seasonal Adjustments
- Data Processing
- Final Results
NEW SINCE LAST TIME

• Additional data has trickled in
• Additional data collection – 43 low priority locations
  – 3 were not counted
• Seasonal and Annual Adjustment Factors
  – Additional PeMS data mining
    • All months for 2006 – 2009
  – Implemented seasonal and annual adjustments
• Final database system
PROJECT OBJECTIVES

• Average Annual Weekday Traffic (AAWT) for Year 2008 Model Validation Project

• Counts on all Screenline locations
  – Vehicle classes (13 FHWA classes)
  – Time periods (15-minute)
  – Occupancy data (Freeways and HOV)
  – Facilities (arterials, collectors, freeways, HOV/HOT, etc.)
  – Coachella Valley – peak season (Feb – Apr) counts

• Non-screenline counts in database if provided electronically

• Expandable factoring to maximize data uses

• Coordinate with SCAG’s Regional Goods Movement Project and the Imperial County Model Development Team to optimize efficiencies
• **Screenline Review**
  – 11 New regional Screenlines
  – Thanks for your input

• **Cordon Locations**
  – All model external stations were inventoried
  – Complete count coverage desired at external stations
1. Data Source
   – Trusted entity
   – Proper methodology and equipment use

2. Directional Distribution
   – Consistent daily directional total volumes

3. Temporal Distribution
   – Bi-modal or tri-modal diurnal distribution
   – Consistent reverse directionality trends

4. Vehicle Classification
   – Reasonable trends
   – Outlier data

5. Missing Data
   – Zero volumes by time of day and vehicle class
   – Site-specific application (some zeroes are ok)

6. Complementary Count Data
   – Counts at upstream and downstream locations
   – Redundant counts at screenline count locations
7. **Traffic Flow and Machine Errors**
   - Caused by simultaneous tripping of counter, stop and go traffic, and deteriorated road surface
   - Difficult to determine, especially from existing counts

8. **Day of Week / Time of Year**
   - No holiday effects
   - No weekend counts
   - Limited number of summer counts
   - Limited Friday and Monday counts

9. **Lane Capacity**
   - Average and reported per lane capacities (e.g., PeMS)

10. **Locational Errors**
    - GIS tagging with manual review

11. **Data Factoring & Expansion**
    - Database calculations
    - Raw vs. final data
### Traffic Counts

<table>
<thead>
<tr>
<th></th>
<th>Arterial and Collector Streets (Local Governments)</th>
<th>Freeway and HOV (PeMS, Caltrans Vehicle Class Counts, WIM Counts)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Existing</strong></td>
<td>• Some data source concerns</td>
<td>• Lane capacity issues</td>
</tr>
<tr>
<td></td>
<td>• Limited data (e.g., time of day, vehicle class)</td>
<td>• Double-Counting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Missing data</td>
</tr>
<tr>
<td><strong>2. Collected</strong></td>
<td>• Generally no issues</td>
<td>• Collected vehicle occupancy and class counts (visual record)</td>
</tr>
<tr>
<td><strong>3. Database</strong></td>
<td>• Primarily comparing raw vs. factored/expanded data</td>
<td>• Primarily comparing raw vs. factored/expanded data</td>
</tr>
</tbody>
</table>
QUALITY CONTROL

- **Manual vs. Automated Quality Review**
  - Electronic availability of data
- **Some criteria difficult to assess (e.g., machine errors, locational errors)**
  - Used information to prioritize count quality and needs
- **Assumes traffic count firms followed proper methodology and kept machines calibrated**
  - Not an issue for collected counts
  - Can be difficult to ascertain for existing counts
- **Assumes counts from agencies and local governments had some level of quality review**
- **Complementary Count Data best quality check**
  - 2 or more consistent counts: very reliable
  - Only 1 count: hard to tell
EXISTING DATA

• “Hierarchy” of Data Sources
  – Caltrans
    • Station Count Data
    • Vehicle Classification Data
    • Freeway Performance Measurement System (PeMS)
    • Excellent coverage for state highways
  – Subregions
    • County Transportation Commissions (CTC)
    • Councils of Governments (COG)
  – Counties
    • Some had data for unincorporated areas
  – Municipalities
    • Varied data quality, type, and availability
    • Focus was on cities traversed by screenlines
EXISTING DATA

• Near complete freeway coverage
  – Limited vehicle classification data
  – Limited / non-existent auto occupancy data
  – Data hourly or by 5-minutes

• Spotty arterial coverage
  – Electronic data was imported and geocoded
  – 4,450 imported counts
DATA COLLECTION (Arterials)

• Screenline Link Data Inventory:
  - Good data available
  - Moderate data available
  - No data available

• Data Needs and Prioritization
  - No data needed
  - High Priority Count Location
  - Low Priority Count Location

• About 300 Arterial Counts Collected
DATA COLLECTION (Arterials)

Legend
- Revised Screenlines
- Low Priority Locations
- Counts Collected
**DATA COLLECTION (Freeway/HOV)**

- Freeway/HOV Occupancy Counts
  - Limited Resources
  - Strategic Locations
  - Paired with PeMS or Caltrans Count Station
  - Visual observation during daylight hours
  - 80 Lanes of data

<table>
<thead>
<tr>
<th></th>
<th>Passenger Vehicles</th>
<th>Large 2 Axle Vehicles</th>
<th>3 Axle Trucks</th>
<th>3 Axle Buses</th>
<th>4+ Axle Trucks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td>82 45 2 1 0</td>
<td>3 2 1 0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>136</td>
</tr>
<tr>
<td>6.15</td>
<td>94 53 2 0</td>
<td>2 1 0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>152</td>
</tr>
<tr>
<td>6.30</td>
<td>112 66 3 0</td>
<td>1 1 0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>184</td>
</tr>
<tr>
<td>6.45</td>
<td>120 69 1 0</td>
<td>4 2 0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>195</td>
</tr>
<tr>
<td>7.00</td>
<td>108 80 1 0</td>
<td>2 2 0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>194</td>
</tr>
<tr>
<td>7.15</td>
<td>117 55 1 0</td>
<td>3 1 0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>176</td>
</tr>
</tbody>
</table>
DATA COLLECTION (Freeway/HOV)
Quality Control of PeMS data

- Used data for Tuesday, Wednesday and Thursday only
- Mainline and HOV data only (no ramp data)
- Elimination of zero-volume counts
- Elimination of Outlier counts
QUALITY CONTROL PEMS DATA

- **Annual Adjustment PeMS Station Subset**
  - At least 5 days of “good” data for all months, 2006-2009
  - 1,745 Resulting PeMS stations

- **Seasonal Adjustment PeMS Station Subset**
  - At least 5 days of “good” data for all months in a single year
  - Annual adjustment factors developed separately for each year
ANNUAL ADJUSTMENTS

• Annual Adjustments
  – Previous analysis for April only
  – GNP, GSP, employment, and other measures do not explain the drop in 2005

Note: Growth factors are shown relative to 2002 for illustrative purposes. Actual adjustment factors are relative to 2008.
• **Annual Adjustments**
  - Use straight-line growth from 2002 to 2006
  - Only a handful of counts are from 2005 or earlier

**Note:**
Growth factors are shown relative to 2002 for illustrative purposes. Actual adjustment factors are relative to 2008.
ANNUAL ADJUSTMENTS

• Annual Adjustments
  – Use PeMS data for all months from 2006 – 2009
  – Gas price and economic influences are evident in 2007 and 2008

Note:
Growth factors are shown relative to 2002 for illustrative purposes. Actual adjustment factors are relative to 2008.
**ANNUAL ADJUSTMENTS**

- **Annual Adjustments**
  - Growth factors are applied separately for each county
  - Reminders
    - Most counts are from 2006 and earlier
    - Counts are adjusted relative to 2008

**Note:**
Growth factors are shown relative to 2002 for illustrative purposes. Actual adjustment factors are relative to 2008.
ANNUAL ADJUSTMENTS

• Annual Adjustment Methodology
  – Most counts are from 2006 or later
  – All counts are from 2004 and later
  – All counts are adjusted to represent 2008 conditions
SEASONAL ADJUSTMENTS

- Seasonal Adjustments: 2008 (Initial analysis)

Note:
Adjustment factors are shown relative to Average Annual Weekday traffic.
Model volumes are factored to represent average April/May/June traffic.
SEASONAL ADJUSTMENTS

• Seasonal Adjustments: 2006

Note:
Adjustment factors are shown relative to Average Annual Weekday traffic.
Model volumes are factored to represent average April/May/June traffic.
• Seasonal Adjustments: 2007

Note:
Adjustment factors are shown relative to Average Annual Weekday traffic

Model volumes are factored to represent average April/May/June traffic.
SEASONAL ADJUSTMENTS

- Seasonal Adjustments: 2009

Note:
Adjustment factors are shown relative to Average Annual Weekday traffic.
Model volumes are factored to represent average April/May/June traffic.

Los Angeles (1,722)
Orange (1,302)
Riverside (179)
San Bernardino (261)
Ventura (34)
Total (3,498)
SEASONAL ADJUSTMENTS

• Seasonal Adjustments: All Years

Note:
Adjustment factors are shown relative to Average Annual Weekday traffic.
Model volumes are factored to represent average April/May/June traffic.
• Seasonal Adjustment Methodology
  – Apply seasonal adjustment factors by:
    • Year
    • County
  – For Ventura County:
    • Use an average adjustment factor for all years
SEASONAL ADJUSTMENTS

• Seasonal Adjustments: Coachella Valley

Note:
Adjustment factors are shown relative to Average Annual Weekday traffic.
Model volumes are factored to represent either off-peak (July/August/September) or peak (February/March/April) traffic.
SEASONAL ADJUSTMENTS

• Coachella Valley
  – Seasonal adjustments separate from the rest of Riverside County
  – Limited Data:
    • 4 Caltrans traffic recorders in 2007
    • 1 Caltrans traffic recorder in 2008
  – One seasonal adjustment curve used for all years
    • All Coachella Valley counts were taken in 2007 or 2008
  – Both Peak season and off-peak season factors have been developed


**DATA PROCESSING**

- **Expansion (Arterial and Collector Streets)**
  - 15-minute with vehicle classification estimated for all arterial/collector locations
  - Estimations based on RSA Groups

<table>
<thead>
<tr>
<th>Data Format</th>
<th>Expansion of Data</th>
<th>Limitations of Expanded Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 15-Minute with Vehicle Classification</td>
<td>Not necessary</td>
<td>None</td>
</tr>
<tr>
<td>2. 15-Minute</td>
<td>By vehicle type at 15-minute level</td>
<td>Potential for atypical truck splits</td>
</tr>
<tr>
<td>3. Hourly with Vehicle Classification</td>
<td>Expand each hour to 15 minutes</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Retain hourly vehicle class splits for sub-hours</td>
<td></td>
</tr>
<tr>
<td>4. Hourly (assumes directional data)</td>
<td>Expand each hour to 15 minutes</td>
<td>Potential for atypical truck splits</td>
</tr>
<tr>
<td></td>
<td>Apply vehicles classes at 15 minute level</td>
<td></td>
</tr>
<tr>
<td>5. 24-Hour (no directional data)</td>
<td>Expand 24 hours to each hour then to 15 minutes</td>
<td>Potential for atypical truck splits</td>
</tr>
<tr>
<td></td>
<td>(generalized peaking)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply vehicles classes at 15 minute level</td>
<td>Directional peaking characteristics are not likely correct</td>
</tr>
</tbody>
</table>
RESULTS (Each Link)

• Arterial Streets
  – Directional 24-Hour Volume
  – Directional peak period/peak hour volumes
  – Vehicle Classification Data
  – Original Source Information

• Freeways
  – 24-Hour Volume
  – Directional peak period/peak hour volumes
  – Original Source Information
## RESULTS

### Screenline and Cordon Coverage

<table>
<thead>
<tr>
<th>Data Format</th>
<th>Original Screenlines</th>
<th>Revised Screenlines</th>
<th>Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Arterial and Collector (Existing Data)</td>
<td></td>
<td></td>
<td>135</td>
</tr>
<tr>
<td>2. Arterial and Collector (Collected Data)</td>
<td>423</td>
<td>534 (+26%)</td>
<td>350</td>
</tr>
<tr>
<td>3. Arterial and Collector (Low Priority with pre-existing Counts)</td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>4. Arterial and Collector (No Count)</td>
<td></td>
<td></td>
<td>20*</td>
</tr>
<tr>
<td>5. Freeways</td>
<td>120</td>
<td>182 (+52%)</td>
<td>182**</td>
</tr>
<tr>
<td>6. HOV</td>
<td>45</td>
<td>53 (18%)</td>
<td>53</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>588</strong></td>
<td><strong>769 (+31%)</strong></td>
<td><strong>769</strong></td>
</tr>
</tbody>
</table>

*20 locations were unpaved (12), posted with “No Trespassing” signs (2), were removed from the screenline (2), or were not possible to count for other reasons (2).

**11 Freeway locations could benefit from updated count data collected as part of SCAG’s Goods Movement Program.
DATABASE CONTENTS

• 5,522 traffic counts
  – Expansion of all data to 15 minutes
  – Expansion of arterial data to 13 vehicle classifications
  – Metadata such as date, source, and latitude and longitude

• Simple user interface
  – Export data summary to a spreadsheet
  – Review detailed data
  – View locations in Google Maps
  – Enter additional data
DATABASE CONTENTS

• GIS layers
  – Linked to the TransCAD network and ArcGIS
  – Pinpoint locations for:
    • Geocoded counts
    • Counts with GPS coordinates

• Powerful analysis tools
  – Modify peak periods, truck groupings
  – Import new data en-masse
  – Modify seasonal and annual adjustment factors
COUNT SUMMARY

Legend
- Collected Traffic Counts
DATABASE INTERFACE

- Review screenline links
DATABASE INTERFACE
• Review individual counts
DATABASE INTERFACE

• Or, just use the final results in Excel
  – Data by period, and daily total
  – Data by vehicle type

<table>
<thead>
<tr>
<th>CountID</th>
<th>SCRL LOC</th>
<th>SCRL</th>
<th>FIL U.</th>
<th>LINK ID</th>
<th>Street</th>
<th>CROSS ST1</th>
<th>CROSS ST2</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>91925</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>102672</td>
<td>LAS VIRGENES RD</td>
<td>Agoura Rd</td>
<td>Lost Hills Rd</td>
<td>LAS VIRGENES ROAD N/W MULHOLLAND HIGHWAY</td>
</tr>
<tr>
<td>42000</td>
<td>1</td>
<td>2</td>
<td>12</td>
<td>102699</td>
<td>MULHOLLAND HIGHWAY</td>
<td>Yerba Buena Rd</td>
<td>Old Topanga Canyon Rd</td>
<td>MULHOLLAND HIGHWAY N/E OLD TOPANGA CANYON</td>
</tr>
<tr>
<td>42001</td>
<td>1</td>
<td>3</td>
<td>13</td>
<td>102745</td>
<td>N TOPANGA CANYON BLVD</td>
<td>Mulholland Dr</td>
<td>Old Topanga Canyon Rd</td>
<td>N TOPANGA CANYON BLVD N/E MULHOLLAND DR</td>
</tr>
<tr>
<td>42002</td>
<td>1</td>
<td>4</td>
<td>14</td>
<td>125433</td>
<td>N SEPULVEDA BLVD</td>
<td>Mission Ave</td>
<td>Mountaingate Dr</td>
<td>SEPULVEDA BLVD N/E MULHOLLAND DR</td>
</tr>
<tr>
<td>71993</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>11984</td>
<td>I-405 (SAN DIEGO Fwy) SB</td>
<td>South of</td>
<td>Skirball Center Dr</td>
<td>I-405 - S @ BEL AIR CR (ML)</td>
</tr>
<tr>
<td>766654</td>
<td>1</td>
<td>6</td>
<td>16</td>
<td>114275</td>
<td>I-405 (SAN DIEGO Fwy) SB/SDV</td>
<td>South of</td>
<td>Skirball Center Dr</td>
<td>I-405 - S @ BEL AIR CR (SDV)</td>
</tr>
<tr>
<td>78774</td>
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<td>7</td>
<td>17</td>
<td>11212</td>
<td>I-405 (SAN DIEGO Fwy) NB</td>
<td>South of</td>
<td>Skirball Center Dr</td>
<td>I-405 - N @ BEL AIR CR (ML)</td>
</tr>
<tr>
<td>42003</td>
<td>1</td>
<td>8</td>
<td>18</td>
<td>100983</td>
<td>ROSCOMARE RD</td>
<td>Mulholland Dr</td>
<td>Belcanto</td>
<td>ROSCOMARE RD N/E MULHOLLAND DR</td>
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<tr>
<td>42004</td>
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<td>9</td>
<td>19</td>
<td>101891</td>
<td>N BEVERLY GLEN BLVD</td>
<td>Mulholland Dr</td>
<td>Nicada Dr</td>
<td>N BEVERLY GLEN BLVD N/E MULHOLLAND DR</td>
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<td>42005</td>
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<td>10</td>
<td>10</td>
<td>101949</td>
<td>BENEDICT CANYON DR</td>
<td>Mulholland Dr</td>
<td>Valletford Dr</td>
<td>BENEDICT CANYON RD N/E MULHOLLAND DR</td>
</tr>
</tbody>
</table>
THANK YOU!

• Thank you for your assistance in providing data to support this effort!