Revising Vehicular Level of Service (LOS) Standards in Pasadena

Mike Bagheri, P.E.

Toolbox Tuesdays-Implementing Complete Streets
March 27, 2012

Southern California Association of Government (SCAG)
• Land use decisions made in the 1994 and 2004 General Plan updates

  > Developed a limited growth strategy that protected the historic neighborhoods that ring the Central District of Pasadena

  > Embraced the potential for transit-oriented development (TOD) along the route of the Gold Line LRT service.
Since the opening of the Gold Line in 2003, Pasadena has seen

> A marked increase in mixed-use and multi-family residential in the Central District
> An intensification of commercial office and employment in the TOD areas.
City’s 2004 Mobility Element
Objectives

- Promote a livable community
- Encourage non-auto travel
- Protect neighborhoods
- Manage multimodal corridors
Changing Expectations

Department of Transportation

• UN Urban Accords
  > Sustainability
  > Green City Action Plan

• State Mandates
  > Reduce Greenhouse Gas (AB 32)
  > Community Sustainability (SB 375)
  > Complete Streets (AB 1358)
What It Means

Department of Transportation

- A change in the perspective from which the performance of the transportation system has been viewed
  - Need to deemphasize auto-centric focus on vehicular delay and speed of travel

- Metrics reflecting livability and sustainability goals must be balanced across modes
  - Shorter and fewer vehicle trips become an important measure in relation to greenhouse gas production.

- The condition of the network for pedestrians and bicyclists becomes a factor in the performance of a multi-modal system

- The availability and connectivity of transit service increases in importance

- The current Level of Service metric does not address the level of complexity inherent in these urban transportation strategies
New Direction for Metrics

Decreasing Emphasis

• Additional capacity/widening streets
• Reducing individual intersection delay/reducing volume to capacity ratio

Increasing Emphasis

• Network management
• Travel time reliability
• Improved transit services
• Complete Streets
  > Multifunctional rights of way: green streets, social spaces
• Managing multimodal system
• 1994 and 2004 Mobility Elements recognized the issues
• Introduced an alternate system of street types
  Multimodal Corridors
  De-emphasized Streets
“The Complete Streets Act of 2007 will ensure that the transportation plans of California communities meet the needs of all users of the roadway including pedestrians, bicyclists, users of public transit, motorists, children, the elderly, and the disabled.”

AB 1358- Effective January 1st, 2011
General Plan & Mobility Element Update

- Define context and functions of the streets, Street Classification System, before implementing complete streets.
- Use Street Classifications System to balance MMLOS mitigation measures tradeoffs.
Proposed Context-based Street Classification

- **Context Types**
  - Freeway Frontage
  - Downtown
  - Main Street
  - City Mix
  - Commercial/Industrial
  - Park
  - Civic
  - Residential

- **Function Types**
  - Freeway
  - Throughway
  - Connectors
  - Access

- **Overlays**
  - One Way
  - Truck Routes
  - Transit
  - Bicycle
  - Emergency Routes
  - Pedestrian Emphasis
  - Landscape
  - Historic Designation
  - Special Events
Context-based Street Types

Department of Transportation

Street Types: Context

Legend:
- Main Street
- Downtown
- Commercial/Industrial
- City Mix
- City MF
- Garden MF
- SF Residential
- Civic
- Park
- Park/Downtown
- Civic/City MF
- Civic/Garden MF
- Civic/SF Residential
- Civic/Park
- Park/Garden MF
- Park/SF Residential
- Street Outside City Boundary

Zoning:
- Single Family Residential
- Garden Residential
- City Residential
- PD: Planned Developments
- IG: Industrial General
- PS: Public/Semi Public
- CO: Commercial Office
- CC: Commercial General
- CL: Limited Commercial
- OS: Open Space
- CD: Central District

City of Pasadena
Street Types
12/2009
Context Types Images

Department of Transportation

Downtown

City Mix

City

Commercial/Industrial

Main Street

Civic

Garden

Park

Single-family

PASADENA
Function Types Images

Sierra Madre-Throughway

Arroyo Parkway-Freeway

Fair Oaks-Throughway

Glenarm - Neighborhood Connector

Washington - City Connector

Access - Street
Public Right-of-Way Shared by Four Major Users
Complete Street Images
• Vehicular-based Intersection Impacts
• Vehicular-based Street Segment Impacts
## Vehicular-based Intersection Significant Impact Thresholds

<table>
<thead>
<tr>
<th>Intersection Level of Service- Pre-project Conditions</th>
<th>Change in V/C (Future w/Project less Future w/o Project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.060</td>
</tr>
<tr>
<td>B</td>
<td>0.050</td>
</tr>
<tr>
<td>C</td>
<td>0.040</td>
</tr>
<tr>
<td>D</td>
<td>0.030</td>
</tr>
<tr>
<td>E</td>
<td>0.020</td>
</tr>
<tr>
<td>F</td>
<td>0.010</td>
</tr>
<tr>
<td>Traffic Growth on Street Segment</td>
<td>Required Traffic Mitigation Measures</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td><strong>0.0 - 2.4% Daily Traffic Growth</strong></td>
<td>Staff review and conditions</td>
</tr>
</tbody>
</table>
| **2.5% - 4.9% Daily Traffic Growth** | • Initial study required if existing count is greater than 2,000 VPD;  
• Soft mitigation required |
| **5.0% - 7.4 % Daily Traffic Growth** | • Initial study required;  
• Soft mitigation required;  
• Physical mitigation may be required |
| **7.5% + Daily Traffic Growth** | • Initial study required;  
• Soft mitigation required;  
• Extensive physical mitigation may be required;  
• Project alternatives may be considered |
Pasadena researched several approaches and evaluated them for their effectiveness with implementing city’s Complete Street vision:

- **Network-based Metrics**
  - Vehicle Miles of Travel (VMT)
  - Travel Time

- **Traveler Experience Metrics**
  - S.F. Pedestrian Environment Quality Index (PEQI)
  - S.F. Bicycle Environment Quality Index (BEQI)
  - Multi-Modal Level of Service (MMLOS)
San Francisco’s Healthy Development Measurement Tool (HDMT) includes transportation-related metrics

- Pedestrian Environmental Quality Index (PEQI)
- Bicycle Environmental Quality Index (BEQI)
- Evaluates design characteristics, volumes, and safety
Multi Modal Level of Service (MMLOS) for Urban Streets

- Multi Modal Level of Service for Urban Streets- National Cooperative Highway Research Program- Report No. 616

- MMLOS Model- The LOS rating for an urban street is the weighted average of the sum of the probabilities of people reporting each LOS rating multiplied by a system of weights that gives greater weight to the proportion of people who perceive poorer level of service.

- Model output is based on users experience

trb.org/publications/nchrp/nchrp_rpt_616.pdf
The MMLOS calculation for each mode is based on each mode’s users perception of level of service and factors that influence their perception. Typical street sections were shown to people in four metro areas. The influential factors for each mode are as follows:

**Motorists:**
- Presence of Median
- Landscaping
- Signal Progression (number of stops)
- Posted Speed Limit

**Pedestrian:**
- Sidewalk Width
- Separation of Walkway from Traffic
- Traffic Speed
- Pedestrian Volumes
- Number of Traffic Lanes
- Traffic Signal Delay
Bicyclists:
- Width of Outside lane
- Presence and width of Bike Lane
- Speed Limit
- Intersection Crossing Width
- Intersection Type of Control

Transit Users:
- Frequency
- Speed
- Reliability, On Time Percentage (OTP)
- Bus Stop Amenities (Bench, Shelter)
- Pedestrians Access to Stops
- Load Factor (Passenger/seat)
LOS model output presented below is used to translate complex numerical performance results into a simple letter grade system representative of the travelers' perception of the resulting quality of service provided by the facility. It is a quantitative stratification of quality of service into six levels of service.

**LOS Letter Grade Numerical Equivalents**

<table>
<thead>
<tr>
<th>LOS Model Output</th>
<th>LOS Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 2.00</td>
<td>A</td>
</tr>
<tr>
<td>2.00 &lt; Model &lt;= 2.75</td>
<td>B</td>
</tr>
<tr>
<td>2.75 &lt; Model &lt;= 3.50</td>
<td>C</td>
</tr>
<tr>
<td>3.50 &lt; Model &lt;= 4.25</td>
<td>D</td>
</tr>
<tr>
<td>4.25 &lt; Model &lt;= 5.00</td>
<td>E</td>
</tr>
<tr>
<td>Model &gt; 5.00</td>
<td>F</td>
</tr>
</tbody>
</table>
Interdependency of all modes is evident in the MMLOS model.
Case Studies

Department of Transportation

- PEQI
- MMLOS
• EIR for an Office Building Project was challenged based on inadequate Analysis of Project’s Impact on Pedestrians

• Integrated PEQI score with the Evaluation Matrix for Alternative Pedestrian Schemes to comply with Court’s Ruling

<table>
<thead>
<tr>
<th>ALTERNATIVE SCHEME NO.</th>
<th>ALTERNATIVE DESCRIPTION</th>
<th>ADA ACCESSIBILITY ISSUES?</th>
<th>POTENTIAL HIC EXACT TO VISUAL LANDMARKS?</th>
<th>PEQI SCORE FOR LESS FREQUENT OPERATIONS (0-99)</th>
<th>POTENTIAL HIC EXACT TO OFF-SITE VEHICLES (0-99)</th>
<th>PRESSURE OF PEQI ON EA'S MOCUS</th>
<th>PRESSURE OF PEQI ON EA'S MAJOR OPERATIONS</th>
<th>PEQI PRESSURE ON EA'S MINOR OPERATIONS</th>
<th>PEQI PRESSURE ON EA'S MINOR OPERATIONS</th>
<th>PEQI PRESSURE ON EA'S MINOR OPERATIONS</th>
<th>PEQI PRESSURE ON EA'S MINOR OPERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unescorted Multi-block Corridor with Morning East and West Sidewalks (Two 4-Mile Areas)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td>2</td>
<td>Unescorted Multi-block Corridor (Two 4-Mile Areas)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>3</td>
<td>Unescorted Multi-block Corridor (Two 4-Mile Areas)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>4</td>
<td>Pedestrian Bridge</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>5</td>
<td>Pedestrian Bridge</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>6</td>
<td>Pedestrian Bridge</td>
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<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>7</td>
<td>Pedestrian Bridge</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>8</td>
<td>Pedestrian Bridge</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>9</td>
<td>Pedestrian Bridge</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:
1. ADA accessibility issues refer to the accessibility of the construction of ADA compliant sidewalks due to existing road adjustments. The calculation for a sidewalk assessment of the construction of the concurrent Project Phase is not considered.
2. Potential significant impacts to Pedestrian Pathways are contour lines from the construction of the selected alternative impacts to pedestrian pathways as shown on the right of way, aesthetic views of the pedestrian pathways, etc.
3. The potential significant impacts to Pedestrian Pathways are contour lines from the construction of the selected alternative impacts to pedestrian pathways as shown on the right of way, aesthetic views of the pedestrian pathways, etc.
4. Potential significant secondary impacts pursuant to impact analysis are summarized in Appendix G of this study. A total of an intersections in the immediate vicinity were formally evaluated, 30 of at least 30 intersections, and 30 of at least 3 intersections.
With assistance from Kittelson & Associates (Formerly Dowling Associates, Inc.), two projects were selected for detailed analysis with the MMLOS approach and for a comparison of the results to the findings of the current approach.
A proposed road diet project—removing two lanes of traffic and installing bike lanes in both directions.

Source: Dowling Associates, Inc.
### MMLOS Results of the Road Diet Project during AM Peak Hours

#### Orange Grove Boulevard - Combined AM

<table>
<thead>
<tr>
<th>Segment</th>
<th>Mode</th>
<th>Existing Score (LOS)</th>
<th>Road Diet Score (LOS)</th>
<th>Difference</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E8</strong> Hill Ave to Allen Ave</td>
<td>Auto</td>
<td>2.34 (B)</td>
<td>2.39 (B)</td>
<td>0.05</td>
<td>2.1%</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>4.46 (E)</td>
<td>4.47 (E)</td>
<td>0.01</td>
<td>0.2%</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>3.44 (C)</td>
<td>2.73 (B)</td>
<td>-0.71</td>
<td>-20.6%</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.45 (B)</td>
<td>2.55 (B)</td>
<td>0.10</td>
<td>4.1%</td>
</tr>
<tr>
<td><strong>E8</strong> Allen Ave to Altadena Dr</td>
<td>Auto</td>
<td>2.25 (B)</td>
<td>2.26 (B)</td>
<td>0.01</td>
<td>0.4%</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>2.60 (B)</td>
<td>2.57 (B)</td>
<td>-0.03</td>
<td>-1.2%</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>3.40 (C)</td>
<td>2.70 (B)</td>
<td>-0.70</td>
<td>-20.6%</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.43 (B)</td>
<td>2.26 (B)</td>
<td>-0.17</td>
<td>-7.0%</td>
</tr>
<tr>
<td><strong>E8</strong> Altadena Dr to Sierra Madre Blvd</td>
<td>Auto</td>
<td>2.52 (B)</td>
<td>2.60 (B)</td>
<td>0.08</td>
<td>3.2%</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>2.61 (B)</td>
<td>2.59 (B)</td>
<td>-0.02</td>
<td>-0.8%</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>3.23 (C)</td>
<td>2.65 (B)</td>
<td>-0.58</td>
<td>-18.0%</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.52 (B)</td>
<td>2.39 (B)</td>
<td>-0.13</td>
<td>-5.2%</td>
</tr>
<tr>
<td><strong>E8</strong> Sierra Madre Blvd to Altadena Dr</td>
<td>Auto</td>
<td>2.50 (B)</td>
<td>2.56 (B)</td>
<td>0.06</td>
<td>2.4%</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>1.87 (A)</td>
<td>1.85 (A)</td>
<td>-0.02</td>
<td>-1.1%</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>2.92 (C)</td>
<td>2.47 (B)</td>
<td>-0.45</td>
<td>-15.4%</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.50 (B)</td>
<td>2.37 (B)</td>
<td>-0.13</td>
<td>-5.2%</td>
</tr>
<tr>
<td><strong>E8</strong> Altadena Dr to Allen Ave</td>
<td>Auto</td>
<td>2.29 (B)</td>
<td>2.27 (B)</td>
<td>0.02</td>
<td>0.9%</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>2.60 (B)</td>
<td>2.57 (B)</td>
<td>-0.03</td>
<td>-1.2%</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>3.38 (C)</td>
<td>2.67 (B)</td>
<td>-0.71</td>
<td>-21.0%</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.44 (B)</td>
<td>2.28 (B)</td>
<td>-0.16</td>
<td>-6.6%</td>
</tr>
<tr>
<td><strong>E8</strong> Allen Ave to Hill Ave</td>
<td>Auto</td>
<td>2.34 (B)</td>
<td>2.51 (B)</td>
<td>0.17</td>
<td>7.3%</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>4.45 (E)</td>
<td>4.47 (E)</td>
<td>0.02</td>
<td>0.4%</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>3.39 (C)</td>
<td>2.72 (B)</td>
<td>-0.67</td>
<td>-19.8%</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.41 (B)</td>
<td>2.52 (B)</td>
<td>0.11</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

Source: Dowling Associates, Inc.
• Proposed Orange Grove Road Diet Project between Hill Avenue and Sierra Madre Boulevard
  > Findings showed that road diet project would improve bicycle LOS with minimal impact on other modes LOS
A mixed-use project consisting of 125,000 sq ft of Retail/Office with a 156-room Hotel
### Summary of Facility Scores by Mode and Overall Score for Lake Avenue

<table>
<thead>
<tr>
<th>Direction</th>
<th>Mode</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Existing</td>
<td>2015</td>
</tr>
<tr>
<td>Northbound</td>
<td>Auto</td>
<td>2.75 (B)</td>
<td>2.76 (C)</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>1.48 (A)</td>
<td>1.51 (A)</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.84 (C)</td>
<td>2.89 (C)</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>4.06 (D)</td>
<td>4.10 (D)</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>2.78 (C)</td>
<td>2.82 (C)</td>
</tr>
<tr>
<td>Southbound</td>
<td>Auto</td>
<td>2.78 (C)</td>
<td>2.81 (C)</td>
</tr>
<tr>
<td></td>
<td>Transit</td>
<td>1.27 (A)</td>
<td>1.33 (A)</td>
</tr>
<tr>
<td></td>
<td>Pedestrian</td>
<td>2.92 (C)</td>
<td>2.99 (C)</td>
</tr>
<tr>
<td></td>
<td>Bicycle</td>
<td>3.97 (D)</td>
<td>4.03 (D)</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>2.74 (B)</td>
<td>2.79 (C)</td>
</tr>
</tbody>
</table>
Case Studies Findings

• Mixed-use Project at Colorado Boulevard and Lake Avenue
  > Compared MMLOS analysis with recent EIR traffic analysis
  > MMOLS approach reasonably predicted the Modes’ perception of the conditions.
  > Findings accurately revealed the need to improve LOS for bicycles on Lake Avenue
MMLOS Challenges

Significant Impact Thresholds & Mitigation Measures
# MMLOS Significant Impact Thresholds

Applying Traditional Vehicular-based Significant Impact Percentages to Establish MMLOS Significant Impact Thresholds (Overall Facility Score)

<table>
<thead>
<tr>
<th>MMLOS LOS Modal Output</th>
<th>MMLOS Mode LOS</th>
<th>MMLOS Future Pre-Project Model LOS</th>
<th>MMLOS Proposed significant Impact Δ Existing vs. W/Project LOS</th>
<th>Vehicular-based Future pre-Project LOS</th>
<th>Significant Impact Thresholds Δ Vehicular-based Existing vs. W/Project LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model ≤2.0</td>
<td>A</td>
<td>A</td>
<td>0.30</td>
<td>A (≥0.60)</td>
<td>0.06</td>
</tr>
<tr>
<td>2.0 &lt; Model ≤2.75</td>
<td>B</td>
<td>B</td>
<td>0.25</td>
<td>B (0.60-0.70)</td>
<td>0.05</td>
</tr>
<tr>
<td>2.75 &lt; Model ≤3.50</td>
<td>C</td>
<td>C</td>
<td>0.20</td>
<td>C (0.70-0.80)</td>
<td>0.04</td>
</tr>
<tr>
<td>3.50 &lt; Model ≤4.25</td>
<td>D</td>
<td>D</td>
<td>0.15</td>
<td>D (0.80-0.90)</td>
<td>0.03</td>
</tr>
<tr>
<td>4.25 &lt; Model ≤5</td>
<td>E</td>
<td>E</td>
<td>0.10</td>
<td>E (0.90-1.0)</td>
<td>0.02</td>
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<tr>
<td>Model &gt;5</td>
<td>F</td>
<td>F</td>
<td>0.05</td>
<td>F (&gt;1.0)</td>
<td>0.01</td>
</tr>
</tbody>
</table>
• Applying traditional vehicular-based thresholds of significant impacts to MMLOS Model output reveals that MMLOS model is not sensitive to minor changes

• Alternate significant impact thresholds must be considered. A few alternatives are:
  1. Worsening of Mode’s LOS by one letter
  2. Only LOS C or better is acceptable
  3. 2% & 1% incremental change for LOS A, B, C, and LOS D, E, F, Respectively
## LOS for the Worst Approach to Each Intersection on Lake Avenue during the PM Peak

<table>
<thead>
<tr>
<th>Segment</th>
<th>Mode</th>
<th>Approach</th>
<th>Existing</th>
<th>2015</th>
<th>2015 + Proj</th>
<th>Difference</th>
<th>% Change</th>
<th>Sig. Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Ave. &amp; Cordova St.</td>
<td>Auto</td>
<td>Intx.</td>
<td>0.658 (B)</td>
<td>0.737 (C)</td>
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<tr>
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<td>1.78 (A)</td>
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<tr>
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<tr>
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<td>SB</td>
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<tr>
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<td>2.13 (B)</td>
<td>2.24 (B)</td>
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<tr>
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<td>2.59 (B)</td>
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<td></td>
<td>Bicycle</td>
<td>NB</td>
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<td>SB</td>
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<td>NB</td>
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</table>

**Alternative 1- Worsening of LOS by one letter:**
- No Impact - Future vs. Future w/Projects

**Alternative 2- LOS C or better**
- Impact, but....

**Alternative 3- incremental change in LOS**
- Impact
MMLOS Mitigation Measures

Department of Transportation

- Street Classifications System can be used as a tool to balance MMLOS mitigation measures tradeoffs.
- Ability to use CEQA substitute mitigation measure provision to improve the mode identified as the priority mode in the Street Classification System, if not the same as impacted mode.
- Use of MMLOS Modes Consolidated Score or individual Segment Modes’ Score to mitigate impacts to the level of insignificance.
## Integrate Traveler Experience Metrics (i.e. MMLOS) into current Guidelines

### Current vs. Proposed Guidelines

<table>
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<th>Intersection</th>
<th>Street Segment</th>
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<tr>
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<tr>
<td><strong>Current Guidelines</strong></td>
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<tr>
<td><strong>Proposed Complete Streets Guidelines</strong></td>
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- Integrate Traveler Experience Metrics (i.e. MMLOS) into current Guidelines.
<table>
<thead>
<tr>
<th>Mode</th>
<th>Current Methodology</th>
<th>Proposed Methodology</th>
<th>Significant Impact Thresholds</th>
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<td>Auto Intersection LOS</td>
<td>Intersection Capacity Utilization (ICU)</td>
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<td>Multi-Modal Level of Service (MMLOS)</td>
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<td>Auto Segment LOS</td>
<td>Ratio of Project + Existing Auto Volumes over Existing Auto Volumes</td>
<td>MMLOS</td>
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<td>Pedestrian Segment LOS</td>
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<td>Bicycle Segment LOS</td>
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<td>MMLOS, BEQI</td>
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<tr>
<td>Transit Segment LOS</td>
<td>None</td>
<td>MMLOS</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Parting Thoughts

Department of Transportation

• People do not fully understand the value of multimodal transportation systems that expand transportation choices and how those choices support other community goals
  > Metrics need to contribute to this understanding, not impede it
  > “What gets measured gets managed” - Peter Drucker

• A few memorable quotes from UCLA Complete Streets Seminar
  > Everyone is a Pedestrian
  > Change is not made by consensus.
  > Implement 15 mph signal progression speed to accommodate bicyclists
Next steps

- Take Street Classification System to the City Council for adoption
- Take CEQA Thresholds to the City Council for adoption
- Incorporate the adopted measures into General Plan EIR and Transportation Review Guidelines.
Mike Bagheri, P.E.
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Pasadena, CA 91101
mbagheri@cityofpasadena.net