West San Jose Mesoscopic Model Development

June 30, 2020
West San José Multimodal Transportation Improvement Plan (MTIP)

• Develop a multimodal transportation plan
• Promote accessibility and sustainable mobility for all users
• Multimodal project evaluation framework
• Funding Opportunities.
• California Transportation Commission (CTC) Comprehensive Multimodal Corridor Plan (CMCP) and Guidelines
Analytical Tools

• City of San Jose Travel Forecasting Model (CSJ Macro Model). The CSJ model is a refinement of the C/CAG VTA Bi-County transportation model (VTA Model)

• A Mesoscopic Model
# Mesoscopic Mode Review

<table>
<thead>
<tr>
<th>FIRM</th>
<th>SOFTWARE</th>
<th>USE IN NORTHERN CALIFORNIA</th>
<th>STRENGTH</th>
<th>WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citilabs</td>
<td>CUBE Avenue (Macro) &amp; Analyst (Meso)</td>
<td>High Low</td>
<td>• Same software as the City Macro TDF model.</td>
<td>Citilabs micro-simulation model (DYNSIM) has had a low market acceptance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• No data transfer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Easy integration</td>
<td></td>
</tr>
<tr>
<td>PTV</td>
<td>VISUM (Macro) VISSIM (Meso)</td>
<td>Low High</td>
<td>• VISSIM is the most used and adopted micro-simulation software.</td>
<td>Requires data transfer (importing network and ODs from the City TDF model into VISUM and VISSIM).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• The Meso model can generate sub-corridor micro-simulation model with minimal work.</td>
<td></td>
</tr>
<tr>
<td>Caliper</td>
<td>TransModeler (Meso)</td>
<td>Very Low</td>
<td></td>
<td>• Requires data transfer (importing network and ODs from the City TDF model into TransModeler).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Micro-simulation model has had a low market penetration and acceptance.</td>
</tr>
<tr>
<td>INRO</td>
<td>EMME (Macro) Dynamoq (Meso)</td>
<td>Very Low Very Low</td>
<td></td>
<td>• Requires data transfer (importing network and ODs from the City TDF model into EMME.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Micro-simulation model has had a low market acceptance.</td>
</tr>
<tr>
<td>SUMO</td>
<td>Open Source</td>
<td>Very Low</td>
<td></td>
<td>• Requires data transfer (importing network and ODs from the City TDF model into SUMO).</td>
</tr>
</tbody>
</table>
Data Collection

Operational Data
- Traffic counts
- Intersection geometry
- Signal timing plans
- Travel Times (INRIX)
- Origin-Destination Trips (StreetLight)

Travel/Trip Making characteristics
- American Community Survey (ACS)
- 2017 Caltrans Household Travel Survey (CHTS)
- LEHD Origin-Destination Employment Statistics Data (LODES)
- Origin-Destination Trips (StreetLight Data)
StreetLight Data

• Trips by Mode
  – Vehicle
  – Transit
  – Pedestrian

• Be cautious when comparing!
  – Vehicle trips are expanded
  – Non-vehicle trips just samples.
ACS Data

Commute Time Distribution for Study Area and Neighboring Geographies

<table>
<thead>
<tr>
<th>RESIDENCE</th>
<th>AVERAGE TIME</th>
<th>LESS THAN 15 MIN</th>
<th>15 – 29 MIN</th>
<th>30 – 44 MIN</th>
<th>45 – 59 MIN</th>
<th>60 – 89 MIN</th>
<th>GREATER THAN 90 MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Jose (City)</td>
<td>32.6 min</td>
<td>17%</td>
<td>40%</td>
<td>22%</td>
<td>8%</td>
<td>8%</td>
<td>4%</td>
</tr>
<tr>
<td>Santa Clara (City)</td>
<td>36.0 min</td>
<td>14%</td>
<td>35%</td>
<td>26%</td>
<td>10%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Campbell (City)</td>
<td>28.9 min</td>
<td>24%</td>
<td>40%</td>
<td>20%</td>
<td>8%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Cupertino (City)</td>
<td>37.3 min</td>
<td>14%</td>
<td>36%</td>
<td>22%</td>
<td>10%</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Santa Clara County</td>
<td>34.9 min</td>
<td>16%</td>
<td>36%</td>
<td>23%</td>
<td>10%</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>Bay Area (9 county)</td>
<td>35.5 min</td>
<td>19%</td>
<td>32%</td>
<td>23%</td>
<td>11%</td>
<td>11%</td>
<td>5%</td>
</tr>
</tbody>
</table>
StreetLight Study Area as the Destination Average Weekday AM Peak Vehicle Trip Duration vs. ACS Workplace

StreetLight Study Area as the Origin Average Weekday AM Peak Vehicle Trip Duration for Trips Originating in the Study Area vs. ACS Average Commute Time in Minutes for Study Area Residents

StreetLight Origin Districts

StreetLight Destination Districts

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Mesoscopic Model

Network: Time Consuming!!
OD Trips (Demand)

- Peak Period Vehicle OD from the City Macro Model.
- Split matrix using “time-slicing factors” to 15-minute intervals
- Initial factors based on traffic counts
- Next OD estimation combined with the Simulation-based Dynamic Assignment (SBA).
- An Iterative Process
Calibration/Validation
Post COVID-19

A new Baseline?

- Telecommute – (20% will continue work at home / CFO’s interviews)

- Telehealth – Insurance Companies/Medicare start paying for virtual doctor visit under CARES Act.

- Tele-Education

- “Bike Spikes” – Bikes are on back order. E-Bikes
- Transit Ridership
- Revenue Shortfall
Thank You.

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mahmadi@iteris.com