Defining and Measuring Success: Lessons from LOS Reform

Jeffrey Tumlin @jeffreytumlin
Got Congestion?

Want Growth?
Acknowledge your current approach is failing
<table>
<thead>
<tr>
<th>LOS</th>
<th>Average delay in seconds per vehicle</th>
<th>Description of motorist perception</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt; 10</td>
<td>Free-flow traffic: “Good” LOS</td>
</tr>
<tr>
<td>B</td>
<td>10.1 – 20</td>
<td>Reasonable free-flow</td>
</tr>
<tr>
<td>C</td>
<td>20.1 – 35</td>
<td>Stable but unreasonable delay begins to occur</td>
</tr>
<tr>
<td>D</td>
<td>35.1 – 55</td>
<td>Borderline “bad” LOS</td>
</tr>
<tr>
<td>E</td>
<td>55.1 – 80</td>
<td>“Bad” LOS: long queues</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 80</td>
<td>Unacceptable: very high delay, congestion</td>
</tr>
</tbody>
</table>

Source: Reid Ewing
ALICIA'S ROOM - EVENING

Alicia, a Mexican American teen, out of room. She slams the door and throws which is covered with worn purple sl
Level of Service F
What’s important depends upon perspective

Traffic engineer: F A

Economist: A F
Problem 1: Last One In

A → D

D → E
Problem 2: Analysis Scale too small
Problem 3: Vehicle Delay, Not Person Delay

Not Moving
- 5
- 20
- 20

150-400 sq ft

Moving
- 20
- 50
- 75 sq ft

1,500 sq ft

5,000 sq ft

Adapted from infographic by Matthew Blackett/Spacing.ca with data from Victoria Transport Policy Institute
Problem 4: Other Modes are the Problem
Problem 5: Mitigations - Shrink the Project?
Problem 6: Mitigations - Move the Project?
Problem 7: Mitigations - Widen the Road
Induced and Latent Demand

- Congestion
- More People Drive
- Widen Roadway
- Faster Driving
Overreliance on LOS is creating the problems it was intended to solve.
How do we use Performance Measures?

- Improving efficiency of system operations
- Managing a given road or corridor
- Prioritizing funding
- Measuring impact of new development
- Imposing development fees
- Reporting to Congestion Management Agency
- Reporting on achievement of various goals
What is transportation for?

- Transportation is not an end in itself
- It is merely a means by which we support individual and collective goals and objectives
Why not Consider...

- Economic Development
  - Job creation
  - Real estate value increase
  - Retail sales

- Quality of Life
  - Access to jobs
  - Access to shopping
  - Residential property value impact

- Social Justice
  - Do benefits accrue equitably?
  - Are investments spread equitably?

- Ecological Sustainability
  - VMT per capita (=CO₂, NOₓ, runoff, etc.)
  - Land use/transportation connection
Case Study: Mountain View CA
1. Parking is your primary traffic management tool

2. Stop using FAR and density control as traffic management proxy.

3. Use parking to create business case for TDM.

4. Share.

5. Future-proof.
Mode Share Targets

Goal: Achieve the mode share targets established in the Shoreline Transportation Study

<table>
<thead>
<tr>
<th>Travel Mode</th>
<th>2030 General Plan Growth Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ridesharing (Carpools and Vanpools)</td>
<td>10%</td>
</tr>
<tr>
<td>Transit (Public and Private)</td>
<td>35%</td>
</tr>
<tr>
<td>Active Transportation</td>
<td>10%</td>
</tr>
<tr>
<td>Single-Occupant Vehicle</td>
<td>45%</td>
</tr>
</tbody>
</table>

- Create a comprehensive bicycle network
- Make walking pleasant and convenient
- Provide a range of transportation options
- Establish a strong TMA and implement TDM programs
TDM Approach

1) Require all employers or property owners seeking development entitlements to:
   - Implement a TDM program designed to achieve a 45% SOV mode share
   - Join the TMA
   - Establish a property/employer specific vehicle trip cap based on a 45% SOV mode share
   - Monitor and report annually vehicle trips generated to ensure they are below their trip cap

2) Institute a district wide vehicle trip cap:
   - Based on the vehicle capacity of the 3 entry points to North Bayshore during the peak period
   - Monitor vehicle trips at entry points biannually to determine when vehicle trips may be nearing the cap

3) Implement congestion pricing if goal not met
Case Study: North Bayshore

- Regulate building character:
  - Height, setback, stepback
  - Materials and design
  - Form Based Code

- Manage traffic directly:
  - Cap vehicle trips
  - Require TDM
  - Limit parking

- Monetize Trip Reduction

- Design for pedestrians and transit first

- Change performance metrics and analysis guidelines
Parking Approach

- No minimums
- 2.7 spaces per 1,000 maximum for office/R&D
- No reserved parking
- Specific requirements for carshare, carpool, and clean vehicles
- Parking supply must match trip reduction commitment
Current Update

• No minimums for residential
• Required unbundling
• Debate about maximums

Future Proofing:

• Retrofitable: Floor-to-ceiling, level floors, removable ramps
• No requirement for parking areas to accommodate humans
Case Study: Santa Monica
Process

- Identify local values
- Identify long list of performance measures
- Refine into short list:
  - Assess today’s conditions
  - Predict future conditions
  - Evaluate projects
  - Conduct EIRs
- Create tools and gather data
- Establish targets and thresholds
- Report back to public and Council
- Adopt impact fee
Start with Transportation Principles

- Measure Success
- Management
- Streets
- Quality
- Public Space
- Environment
- Health
- Affordability
- Economy
- Equity
- Safety
- Public Benefits
Creating a Shortlist

• For each principle, a long list of potential measures – and tools for measuring

• Next step: Short list:
  – Shortest list of measures that captures Santa Monica values
  – Minimize data collection costs
  – Maximize clarity

• Some measures, like per capita Vehicle Miles Traveled, capture many values: Greenhouse gases, congestion, air quality, etc.
## The Long List

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cost/Time Consumption</th>
<th>Implementation</th>
<th>EIR</th>
<th>Project Review</th>
<th>Corridor Review</th>
<th>Report Card</th>
<th>Travel Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MANAGEMENT</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>• Relative travel times by mode</td>
<td>Medium</td>
<td>Can be modeled; see WeHo traffic model. Can also be collected through data collection. Transit travel times can be automated in GPS.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>• Person capacity – walking, bike, transit, auto, parking, bike parking</td>
<td>Medium - Heavy</td>
<td>This is a GIS/Excel type function that can be included if there is survey data available. Can be modeled. This needs to be further defined.</td>
<td>✓?</td>
<td></td>
<td>✓</td>
<td>✓?</td>
<td>✓?</td>
</tr>
<tr>
<td>• Transit LOS: productivity, farebox return, delay, reliability</td>
<td>Medium - Heavy</td>
<td>This will take extensive model development if we want to get to this level in the demand model. Direct ridership modeling would be another option and would require less data/development time. Transit LOS could also be developed and monitored separate from the model in an Excel spreadsheet. BBB already does a basic collection of this info, and full transit LOS data may be available in upcoming GPS reporting from BBB. Seattle uses transit LOS in an annual GIS report card map, focusing on transit speed and frequency. SF uses transit LOS in their EIRs</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>• Neighborhood spill-over</td>
<td>Medium</td>
<td>Either traffic volumes or driver behavior (speed, etc)</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Congestion</td>
<td>Light</td>
<td>The sustainability report card currently measures intersection LOS. Congestion is also indirectly measured in the relative travel times by mode and the person capacity analysis above. (There is community resistance to using intersection LOS.) Adjust significance thresholds if used for EIRs.</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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</table>
Vary targets by Context
## Santa Monica: Application

- **Main Street**

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>CONTEXT ZONE</th>
<th>Minimum</th>
<th>Desirable</th>
<th>Preferred</th>
<th>Measured</th>
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<tbody>
<tr>
<td>Transit</td>
<td>Secondary N’hood Commercial</td>
<td>≥-1</td>
<td>≥-0.5</td>
<td>≥+1</td>
<td>-0.8</td>
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<tr>
<td>Auto</td>
<td>Secondary N’hood Commercial</td>
<td>&lt;1.2</td>
<td>&lt;0.8</td>
<td>&gt;0.6</td>
<td>0.75</td>
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<tr>
<td>Pedestrian</td>
<td>Primary N’hood Commercial</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

- **Result:** OK to slightly degrade auto QOS to improve transit and pedestrian QOS. Signal prioritization OK, but not dedicated transit lane.
- **Goal:** Bring all measures into *balance*
Tools and Data

- GIS mapping
- Transportation Demand Management reporting data
- Big Blue Bus GPS data
- Public perception surveys
- Traffic counts
2012 Sustainable City Report Card

The Sustainable City Plan was created to enhance our resources, prevent harm to the natural environment and human health, and benefit the social and economic well-being of the community for the sake of current and future generations.
Case Study: San Francisco
TRANSPORTATION SUSTAINABILITY PROGRAM

Keeping people moving as our city grows

align
MODERNIZE ENVIRONMENTAL REVIEW

shift
ENCOURAGE SUSTAINABLE TRAVEL

invest
ENHANCE TRANSPORTATION TO SUPPORT GROWTH

More meaningful transportation analysis that better captures environmental effects

On-site transportation amenities that reduce reliance on driving

Development fee to help fund transit and safer streets
TDM Ordinance Targets

Based on # off-street vehicular parking spaces

Residential and Office Projects
- 0 to 20 spaces = 13 points
- Every additional 10 spaces = 1 point

Retail
- 0 to 4 spaces = 9 points
- Every additional 2 spaces = 1 point

Other Land Uses
- To be determined, but similar in concept

Proposed Exemptions*
Residential:
- 100% Affordable Housing
- < 10 dwelling units
Non-Residential:
- < 10,000 sf

Grandfathering
No building permit sign-off from Planning = subject to Ordinance

*Only if the projects do not exceed required or allowable amount of off-street vehicular parking.
TDM Tool

Menu of 30 Measures:
Under the control of the developer or tenant
All reduce single occupancy vehicle trips and vehicle miles traveled (VMT)

- Active Transportation Related (10)
- High Occupancy Vehicle (5)
- Parking (4)
- Design (3)
- Car-Share (3)
- Family (2)
- Land Use (2)
- Management (1)

Range of Effectiveness

<table>
<thead>
<tr>
<th>Low: 1 point</th>
<th>Medium: 3 points</th>
<th>High: 10+ points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayfinding Signage</td>
<td>Showers and Lockers</td>
<td>Bicycle Beyond Code</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public Transit Subsidy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduced Parking Supply</td>
</tr>
</tbody>
</table>
Best practice

• Focus on outcomes.
• Ensure your local values are reflected and quantified. Include the triple bottom line.
• Use available or easily collectable data.
• Focus on citywide or regional impacts: don’t make things a lot worse for everyone in order to make things a little better for a few.
• MMLOS can be bad for transit, biking and walking if misapplied.
• Focus on quality, not crowding.
• For congestion, focus on per capita Vehicle Miles Traveled.
What about Montgomery County?
Ensure alignment with goals

- Direct development to established communities and town centers
- Preserve parkland and agriculture
- Provide better transportation choices

Image: Urbanmidatlantic
Focus on Transportation Demand Management

• Allow additional entitlement in exchange for trip reduction

• Require:
  – Reduced parking
  – Paid parking or parking cashout with $5/day floor
  – Unbundled parking from commercial and residential leases

• Create TDM menu, with points assigned based upon program effectiveness. Require minimum point achievement.

• Consider:
  – Eliminate density controls in infill areas
  – Establish motor vehicle trip or VMT cap
  – Create traffic cap-and-trade program
Focus on Parking

• 42% of all public parking spaces in Silver Spring and 28% in Bethesda are empty at any given time.

• Eliminate all minimum parking requirements in mixed use and transit accessible areas. Replace with parking maximums.

• Require sharing and unbundling.

• Require pricing or cashout on a daily basis, with $5/day floor.

• Consider a per parking space impact fee, one-time and annual.
Adjust Impact Fees

- Focus on *marginal* cost of new development
- Adjust based upon actual Vehicle Miles Traveled, including Transportation Demand Management
- Reward parking reduction
- Use resulting fee revenue wherever it creates greatest benefit, *not* adjacent to project.
Rethink Congestion

• Drop LOS. Replace with:
  – Per capita Vehicle Miles Traveled
  – Person hours of travel
  – Corridor person travel time
  – Corridor person delay

• Decide where to put your congestion
For More Information

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Mobility Accessibility Sustainability

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USA

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Case Study: Portland
Evaluating Opportunities

- Potential HCT corridors and projects from historic planning and outreach
- November 2008
  MTAC/TPAC

- Evaluation criteria
- January 2009
  Council/MPAC/JPACT/MTAC/TPAC

- Approx. 10-20 corridors to be evaluated

- Final corridors and projects to prioritize
- March 2009
  Council/MPAC/JPACT/MTAC/TPAC

- Going places Regional High Capacity Transit System Plan
- Late spring 2009

- 2035
  December 2009
  RTP adoption

- Implementation of Making the Greatest Place
  2010/2011
Round I Screening

• Current and future ridership potential
• Connectivity & system benefit
• Cost & corridor availability
• Environment constraints
• Equity
• Congestion
• Alignment with 2040 Growth Concept
• Transit origins and destinations
DISCUSSION DRAFT
01/06/2009

Going places
REGIONAL HIGH CAPACITY TRANSIT SYSTEM PLAN

Legend:
Transit
- High Capacity Transit (HCT) (2009)
- Planned High Capacity Transit (adopted)
- Existing Frequent Bus Route

2040 Growth Concept
- Central City
- Regional Center
- Town Center
- Urban Growth Boundary

Railroad
- School

*High Capacity Transit (HCT) can include:
- Light Rail
- Bus Rapid Transit
- Rapid Streetcar
- Commuter Rail

HCT* Corridors
- Corridors Recommended For Advancement
- Corridors Not Recommended For HCT Advancement

RTC HCT Corridors
- Potential Corridor Extensions (corridors extending to neighboring cities to be measured by travel demand)

Parks/Open Space
- County Boundary

Metro

Portland Central City: To be determined through Central City Plan update
Multiple Account Evaluation (MAE)

- Adopted from United Kingdom
- New Approach To Transport Appraisal (NATA)
- Multiple “benefit accounts” considered
- Criteria selected based on local conditions/values
Applying the MAE

- Organized into three “accounts” that correspond to the outcomes-based RTP evaluation approach:
### 25 Evaluation Criteria

<table>
<thead>
<tr>
<th><strong>Community</strong></th>
<th><strong>Environment</strong></th>
<th><strong>Economy</strong></th>
<th><strong>Deliverability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Supportiveness of Existing Land Uses</td>
<td>EN1: Reduction in Emissions and Disturbance</td>
<td>EC1: Transportation Efficiency (Operator – cost per rider)</td>
<td>D1: Total Project Capital Cost (Exclusive &amp; Non-Exclusive ROW Options)</td>
</tr>
<tr>
<td>C2: Local Aspirations</td>
<td>EN2: Risk of Natural Resource Disturbance</td>
<td>EC2: Transportation Efficiency (System annualized capital &amp; operating cost per rider)</td>
<td>D2: Capital Cost Per Mile (Exclusive &amp; Non-Exclusive ROW Options)</td>
</tr>
<tr>
<td>C4: Ridership Generators</td>
<td></td>
<td>EC4: Rebuilding/ Redevelopment Opportunity (vacant and redevelopable land)</td>
<td>D4: Total Corridor Ridership</td>
</tr>
<tr>
<td>C5: Support of regional 2040 Growth Concept</td>
<td></td>
<td></td>
<td>D5: Funding Potential</td>
</tr>
<tr>
<td>C6: Integration with Regional Transit System <em>(Addressed in White Paper)</em></td>
<td></td>
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<tr>
<td>C7: Integration with Other Road Uses</td>
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<tr>
<td>C8: Congestion Avoidance Benefit</td>
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<td>C9: Equity Benefit</td>
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<tr>
<td>C10: Health (Promotion of Physical Activity)</td>
<td></td>
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<tr>
<td>C11: Safety and Security <em>(Addressed in White Paper)</em></td>
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<tr>
<td>C12: Housing + Transportation Affordability Benefit</td>
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<tr>
<td>C13: Transportation Efficiency (User Travel Time Savings)</td>
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</table>
# MAE Matrix

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</tr>
</thead>
<tbody>
<tr>
<td>Clackamas Town Center to Oregon City via 1-205 (LRT)</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1 2 1 0</td>
<td>1 -1</td>
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<tr>
<td>Park Ave to OCTC via McLoughlin (LRT extension)</td>
<td>0</td>
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<td>2</td>
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<td>3 1 0 1 1 1</td>
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<tr>
<td>Portland to Sherwood via Barbur/Hwy 59 (LRT)</td>
<td>3</td>
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<td>Hillsboro to Forest Grove (LRT extension)</td>
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<td>3</td>
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<td>Gresham to Troutdale Extension (LRT Extension)</td>
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<td>Troutdale to Damascus (LRT)</td>
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<td>-1</td>
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<td>Sunset Transit Center to Hillsboro via Hwy 26 / Evergreen</td>
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<td>-1</td>
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<tr>
<td>Tannahome (LRT extension)</td>
<td>1</td>
<td>3</td>
<td>-2</td>
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