Transportation to What Ends?

Updating the Metric of Transportation Impact under SB 743

Chris Ganson
Senior Advisor for Transportation
Governor’s Office of Planning and Research
The point of cities is multiplicity of choice.

-Jane Jacobs
Old metric:
Transportation impact = **Level of Service (LOS)**

<table>
<thead>
<tr>
<th>LOS</th>
<th>Signalized Intersection</th>
<th>Unsignalized Intersection</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤10 sec</td>
<td>≤10 sec</td>
</tr>
<tr>
<td>B</td>
<td>10–20 sec</td>
<td>10–15 sec</td>
</tr>
<tr>
<td>C</td>
<td>20–35 sec</td>
<td>15–25 sec</td>
</tr>
<tr>
<td>D</td>
<td>35–55 sec</td>
<td>25–35 sec</td>
</tr>
<tr>
<td>E</td>
<td>55–80 sec</td>
<td>35–50 sec</td>
</tr>
<tr>
<td>F</td>
<td>≥80 sec</td>
<td>≥50 sec</td>
</tr>
</tbody>
</table>
Level of Service A
Level of Service F

Source: Neighborhoods.org
Which is better?

45 min commute, including 5 min from congestion

Good LOS Grade
Bad Accessibility

20 min commute, including 10 min from congestion

Bad LOS Grade
Good Accessibility

July 2018
Auto Delay-Based Impact Analysis: Fundamental Problems

1. Good grade in LOS ≠ Success in Transportation

Denver 1982

- Travel Time Index: 1.09
- Average travel time: 50.6 minutes (46.4 mins + 4.2 mins)

Denver 2007

- Travel Time Index: 1.31
- Average travel time: 49.6 minutes (37.9 mins + 11.7 mins)

1. Good grade in LOS ≠ Success in Transportation

A COMPARISON OF CHARLOTTE AND CHICAGO

<table>
<thead>
<tr>
<th></th>
<th>Average Trip</th>
<th>Travel Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHICAGO</strong></td>
<td>13.5mi</td>
<td>22.8min</td>
</tr>
<tr>
<td><strong>CHARLOTTE</strong></td>
<td>19.0mi</td>
<td>9.8min</td>
</tr>
</tbody>
</table>

Driven Apart: How sprawl is lengthening our commutes and why misleading mobility measures are making things worse

Executive Summary: http://www.opr.ca.gov/docs/Driven_Apart-How_Spral_Is_Legthening_Our_Communities.pdf

Auto Delay-Based Impact Analysis: Fundamental Problems

1. Good grade in LOS ≠ Success in Transportation

Figure 1 The Relationship between Proximity to Jobs and Job Accessibility (left) and Local Area Traffic Speeds and Job Accessibility (right) in the San Francisco Bay Area

Osman, Thomas, Mondschein, Taylor – MTC Area
1. Good grade in LOS ≠ Success in Transportation

Figure 1 The Relationship Between Proximity To Jobs And Job Accessibility (left) and Local Area Traffic Speeds And Job Accessibility (right)

Mondschein, Osman, Taylor, Thomas – SCAG Area
1. Good grade in LOS ≠ Success in Transportation

With infill development, “…time lost to commuter traffic delays is more than off-set by the greater opportunities to reach destinations over shorter distances to which high development densities gives rise.”

Mondschein, Osman, Taylor, Thomas
1. Good grade in LOS ≠ Success in Transportation

“...myopic focus on the traffic impacts of new developments is misguided and may actually decrease accessibility and economic activity in an effort to protect traffic flows.”

Mondschein, Osman, Taylor, Thomas
1. Good grade in LOS ≠ Success in Transportation

*Figure 1: The Relationship between Traffic Delay and GDP in American Metros*®

Dumbaugh et al., *Decisions, Values, and Data: Understanding Bias in Transportation Performance Measures* (ITE Journal, August 2014)
Amazon Chooses a Little Congestion – and Real Transportation Options

By Andy Clarke, Director of Strategy

There are twenty cities around the United States that must be pretty excited today at making it onto Amazon’s short list for HQ2. Ironically, most of those cities are also awaiting their annual inclusion at the top of the naughty list for congestion – which might seem like a contradiction, especially thinking about a business that is built on the reliability of delivery services and wants to add up to 50,000 jobs to a local economy.

I take two things from this apparent contradiction. First, the Inrix Congestion Index is clearly measuring the wrong things if 8 of their “worst” ten cities are in the running for HQ2 (and the only ones missing are Seattle or HQ1, and San Francisco). Second, Amazon is sticking to its promise of looking for places with a truly multimodal transportation system, as most of the candidates also have mature and well-used transit systems, can boast among the most successful bikesharing systems, and are recognized as leading cities for walkability and bike-friendliness.
The state planning priorities, which are intended to promote equity, strengthen the economy, protect the environment, and promote public health and safety in the state, including in urban, suburban, and rural communities, shall be as follows:

(a) To promote infill development...
Analysis of infill
development using LOS
Analysis of infill development using LOS

Relatively little vehicle travel loaded onto the network
Analysis of *infill* development using LOS

Relatively little vehicle travel loaded onto the network

...but numerous LOS impacts
Analysis of greenfield development using LOS
Analysis of greenfield development using LOS

Typically three to four times the vehicle travel loaded onto the network relative to infill development
Analysis of greenfield development using LOS

Typically three to four times the vehicle travel loaded onto the network relative to infill development

...but relatively few LOS impacts

Traffic generated by the project is disperse enough by the time it reaches congested areas that it doesn’t trigger LOS thresholds, even though it contributes broadly to regional congestion.
Auto Delay-Based Impact Analysis: Fundamental Problems

1. Good grade in LOS ≠ Success in Transportation
2. LOS assessments are expensive, time consuming, and inaccurate
Auto Delay-Based Impact Analysis: Fundamental Problems

1. Good grade in LOS ≠ Success in Transportation
2. LOS assessments are expensive, time consuming, and inaccurate
3. “Fixing” LOS simply moves congestion elsewhere

http://www.opr.ca.gov/docs/ITE_Journal_Article_-_Decisions_Values_and_Data.pdf

Braess’s Paradox

https://en.wikipedia.org/wiki/Braess%27s_paradox
1. Punishes last-in, inhibits infill, pushes development outward

http://www.opr.ca.gov/docs/ITE_Journal_Article_-_Decisions_Values_and_Data.pdf
1. Punishes last-in, inhibits infill, pushes development outward

2. Inhibits transit and active transportation

http://www.opr.ca.gov/docs/ITE_Journal_Article_-_Decisions_Values_and_Data.pdf
Auto Delay-Based Impact Analysis: Secondary Problems

1. Punishes last-in, inhibits infill, pushes development outward
2. Inhibits transit and active transportation
3. Forces more road construction than we can afford to maintain

Auto Delay-Based Impact Analysis: Secondary Problems

1. Punishes last-in, inhibits infill, pushes development outward
2. Inhibits transit and active transportation
3. Forces more road construction than we can afford to maintain
4. Generates an array of environmental impacts


Peer-reviewed research on environmental impacts from high VMT projects:
- Emissions
  - GHG
  - Regional pollutants
- Energy use
  - Transportation energy
  - Building energy
- Water
  - Water use
  - Runoff – flooding
  - Runoff – pollution
- Consumption of open space
  - Sensitive habitat
  - Agricultural land
Auto Delay-Based Impact Analysis: Secondary Problems

1. Punishes last-in, inhibits infill, pushes development outward
2. Inhibits transit and active transportation
3. Forces more road construction than we can afford to maintain
4. Generates an array of environmental impacts
5. Worsens public health and safety

Updated metric of transportation impact: VMT
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
2. Streamline infill
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects

<table>
<thead>
<tr>
<th>2 people</th>
<th>1 person</th>
<th>1 person</th>
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<tbody>
<tr>
<td></td>
<td></td>
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<tr>
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</tbody>
</table>

40 people
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. Streamline locally-serving retail
6. Streamline modeling for remaining projects
7. Attack regional congestion more effectively
8. Reduce future pavement maintenance deficits
9. Massive public health improvements
10. Reduction in GHG and other emissions
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. **Streamline locally-serving retail**
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
2. Streamline infill
3. Streamline transit projects
4. Streamline active transportation projects
5. Streamline locally-serving retail
6. Streamline modeling for remaining projects

http://www.caleemod.com/
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
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6. Streamline modeling for remaining projects
7. **Attack regional congestion more effectively**

http://www.opr.ca.gov/docs/ITE_Journal_Article_-_Decisions_Values_and_Data.pdf
Benefits of VMT as a Measure of Transportation Impact

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7. Attack regional congestion more effectively
8. **Reduce future pavement maintenance deficits**

http://lgc.org/wordpress/docs/events/first_thursday_di
ners/ftd_2013_Protecting_Transportation-june.pdf
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
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6. Streamline modeling for remaining projects
7. Attack regional congestion more effectively
8. Reduce future pavement maintenance deficits
9. Large improvements in public health

> 21,000 deaths/y attributable to physical inactivity in California

Achieving CA’s mode share targets:
- 2,095 fewer deaths annually
- $1 billion-$15 billion/y prevented premature death and disability

Benefits of VMT as a Measure of Transportation Impact

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“Automobile-Dependency as a Barrier to Vision Zero: Evidence from the States in the USA”

“The results of our panel models and supplementary analysis of state effects show that two variables — Vehicle Miles Traveled and Vehicles per Capita—have the strongest impact on traffic fatality rates.”
Benefits of VMT as a Measure of Transportation Impact

1. Streamline TOD
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4. Streamline active transportation projects
5. Streamline locally-serving retail
6. Streamline modeling for remaining projects
7. Attack regional congestion more effectively
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<table>
<thead>
<tr>
<th>Country</th>
<th>Traffic deaths per 100K pop</th>
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<tbody>
<tr>
<td>Sweden</td>
<td>2.8</td>
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<tr>
<td>UK</td>
<td>2.9</td>
</tr>
<tr>
<td>Switzerland</td>
<td>3.3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.4</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.5</td>
</tr>
<tr>
<td>Singapore</td>
<td>3.6</td>
</tr>
<tr>
<td>Spain</td>
<td>3.7</td>
</tr>
<tr>
<td>Germany</td>
<td>4.3</td>
</tr>
<tr>
<td>Japan</td>
<td>4.7</td>
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<tr>
<td>Finland</td>
<td>4.8</td>
</tr>
<tr>
<td>France</td>
<td>5.1</td>
</tr>
<tr>
<td>USA</td>
<td>10.6</td>
</tr>
</tbody>
</table>

Benefits of VMT as a Measure of Transportation Impact

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8. Reduce future pavement maintenance deficits
9. Large improvements in public health
10. Reduction in GHG and other emissions
CA GREENHOUSE GAS INVENTORY 2014
BY SECTOR AND ACTIVITY (2016 EDITION)

Transportation-Related Industrial Emissions

- 9.9% Pipelines
- 54.3% Petroleum Refining and Hydrogen Production
- 35.7% Oil and Gas Extraction

- 24% Transportation
- 12% Industrial
- 8% Commercial
- 8% Residential
- 6% Agriculture and Forestry
- 5% Electricity Generation (In-State)
- 6% Electricity Generation (Imports)

http://ca50million.ca.gov/Transportation/transportation.html
Background – State GHG Goals
Background – State GHG Goals

![Bar chart showing GHG reduction targets](https://www.arb.ca.gov/cc/sb375/final_staff_proposal_sb375_target_update_october_2017.pdf)
A sand tornado passes through as thousands of Kurds stream into Dikmetas, Turkey, from Syria in September 2014. Years after rural residents fleeing drought poured into Syria's cities, helping to spark a civil war, the region remains in turmoil.

PHOTOGRAPH BY JOHN STANMEYER, NATIONAL GEOGRAPHIC

Climate Change Helped Spark Syrian War, Study Says

Research provides first deep look at how global warming may already influence armed conflict.

BY CRAIG WELCH, FOR NATIONAL GEOGRAPHIC
743: Three Cases

1. Project streamlined

2. Project mitigates VMT to less than significant

3. Project mitigates VMT as feasible, but VMT remains significant

S.O.C.
If California is serious about climate change, the car can't be king of our roads

The new guidelines allow projects that are specifically designed to reduce vehicle trips, such as the creation of a new bike lane, to be exempted from lengthy transportation studies and shielded from legal challenges under CEQA. Projects such as an apartment complex built within a half-mile of a major transit stop also could escape lengthy study because they are likely to reduce car travel. Cities are expected to develop computer models to estimate how many vehicle trips a project would generate.

California has set an ambitious target of reducing greenhouse gases 40% below their 1990 level by 2030. The state simply cannot reach that goal without a dramatic cut in emissions from cars and trucks, which are the largest source of greenhouse gases in the state. Increasing the number of electric cars on the road will help, but that alone won't suffice. California communities have to be redesigned to make it easier for people to walk, bike or take transit. Changing CEQA is an important step forward.
Benefits of VMT as a Measures of Transportation Impact

Picturing a low-VMT future

Image Credit: Urban Advantage, Roma Design Group, City of Dana Point
Benefits of VMT as a Measures of Transportation Impact

Picturing a low-VMT future

Image Credit: Urban Advantage, Roma Design Group, City of Dana Point
Benefits of VMT as a Measures of Transportation Impact

...as well as for rural areas
VMT in Case Law

**NEPA**


Include land use effects of roadway capacity projects

**CEQA**


Include transportation energy in energy impacts


*Cleveland Nat’l Forest Fdn. v. SANDAG* (2017) 17 Cal.App.5th 413

Include a low VMT alternative
With VMT as the metric of transportation impact, how do we do transportation planning?
Plan Transportation for the Well-Being of Your City (Not Vice Versa)

Assess transportation infrastructure investments by how much they will improve Access to Destinations
Assess transportation infrastructure investments by how much they will improve Access to Destinations.
Technical Advisory on Evaluating Transportation Impacts in CEQA
Land Use Projects
Streamline low VMT projects
Mitigate high VMT projects

Transportation Infrastructure Projects
Streamline VMT-reducing projects
Streamline projects which increase VMT only marginally
Mitigate projects which substantially increase VMT
VMT Assessment for Land Use Projects
OPR Recommendations on Methodology – Land Use

- Use VMT screening maps for residential and office projects
- Presume development near transit LTS*
- Presume locally-serving retail LTS
- More stringent thresholds may be applied at lead agency discretion

*Exceptions:
- FAR < 0.75
- Parking > minimum requirements
- Inconsistent with SCS
Residential project recommendations:
• Assess residential with trip-based approach
• Threshold: 15 percent below regional or city* VMT/capita
  * For above-average VMT cities

Office project recommendations:
• Assess office with trip-based approach
• Threshold: 15 percent below regional VMT/employee
Retail project recommendations:

- Assess retail with “Net VMT” approach
- Retail which increases VMT compared to previous shopping patterns may be considered significant
- Local-serving retail presumed less than significant
Mixed-use development

- Consider uses separately or focus on predominate use
- Compare to relevant threshold
- Take credit for internal capture
Other recommendations:

- **Rural projects** choose thresholds on a case-by-case basis
- **Small projects** screening threshold – 110 vehicle trips per day
OPR Recommendations on Methodology – All Projects

CEQA Rule of Reason requires capturing spillover VMT
Methodologies for...
1. Threshold determination
2. Project Assessment
3. Project Mitigation
...should be apples to apples
Transportation Projects
Transportation Project recommendations

• Analyze VMT with “Net VMT” approach

• Presume Less than Significant:
  – Transit projects
  – Active transportation projects
  – Roadway projects which only marginally add capacity...
Roadway projects which add only marginally to capacity presumed to lead to less than significant VMT:

- Rehabilitation, maintenance, replacement and repair
- Roadway shoulder enhancements
- Addition of an auxiliary lane of less than one mile
- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left, right, and U-turn pockets, or emergency breakdown lanes
- Addition of roadway capacity on local or collector streets
- Conversion of existing general purpose lanes (including ramps) to managed lanes or transit lanes
- Reduction in number of through lanes
- Grade separation
- Installation, removal, or reconfiguration of traffic control devices
- Timing of signals
- Installation of roundabouts
- Installation of traffic calming devices
- Adoption of or increase in tolls
- Addition of tolled lanes, where tolls are sufficient to mitigate VMT increase
- Initiation of new transit service
- Conversion of streets from one-way to two-way
- Removal of off-street parking spaces
- Adoption or modification of on-street parking or loading restrictions
- Addition of traffic wayfinding signage
- Any lane addition under 0.3 miles in length
Transportation Project recommendations

• Analyze VMT with “Net VMT” approach
• Presume Less than Significant:
  – Transit projects
  – Active transportation projects
  – Roadway projects which only marginally add capacity
• Projects which substantially increase roadway capacity may induce vehicle travel
Impact of Highway Capacity and Induced Travel on Passenger Vehicle Use and Greenhouse Gas Emissions

Technical Background Document

Susan Handy, University of California, Davis
Marlon G. Boarnet, University of Southern California

September 30, 2014

Policy Brief:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_brief.pdf

Technical Background Document:
http://www.arb.ca.gov/cc/sb375/policies/hwycapacity/highway_capacity_bkqd.pdf
Research on Induced Travel

Increasing Highway Capacity Unlikely to Relieve Traffic Congestion

Susan Handy
Department of Environmental Science and Policy
University of California, Davis

Issue

Reducing traffic congestion is often proposed as a solution for improving fuel efficiency and reducing greenhouse gas (GHG) emissions. Traffic congestion has traditionally been addressed by adding additional roadway capacity via constructing entirely new roadways, adding additional lanes to existing roadways, or upgrading existing highways to controlled-access freeways. Numerous studies have examined the effectiveness of this approach and consistently show that adding capacity to roadways fails to alleviate congestion for long because it actually increases vehicle miles traveled (VMT).

An increase in VMT attributable to increases in roadway capacity where congestion is present is called “induced travel”. The basic economic principles of supply and demand explain this phenomenon: adding capacity decreases travel time, in effect, increased roadway capacity induces additional VMT in the short-run and even more VMT in the long-run. A capacity expansion of 10% is likely to increase VMT by 3% to 6% in the short-run and 6% to 10% in the long-run. Increased capacity can lead to increased VMT in the short-run in several ways: if people shift from other modes to driving, if drivers make longer trips (by choosing longer routes and/or more distant destinations), or if drivers make more frequent trips. Longer-term effects may also occur if households and businesses move to more distant locations or if development patterns become more dispersed in response to the capacity increase. One study concludes that the full impact of capacity expansion on VMT materializes within five years and another concludes that the full effect takes as long as 10 years.
Key findings:

• Adding highway capacity induces VMT

• The Quality of evidence on this phenomenon is high

• Each 1% increase in lane miles causes VMT to ultimately rise by 0.6 to 1.0%

• The research controls for other factors such as population and economic growth; the added VMT results from the capacity increase

• The added VMT is truly new, not shifted from elsewhere

• The new VMT tends to increase GHGs

• The new highway capacity does not increase overall employment or economic activity
Induced Travel: Components

How roadway expansion adds traffic

Capacity added $\rightarrow$

travel time initially reduced $\rightarrow$

1. Longer trips ($\uparrow$ VMT)
2. Mode shift toward automobile ($\uparrow$ VMT)
3. Newly generated trips ($\uparrow$ VMT)
4. Route changes (can $\uparrow$ or $\downarrow$ or VMT)
5. More disperse land use development ($\uparrow$ VMT)
Assessing Induced Travel

Two methods:

1. Elasticity (long run)
   - Not customized to project
   + Can’t be gamed
   + Includes all components of induced travel (including land use)

2. Travel demand model
   - Easily gamed
   - Omits land use changes (and sometimes trip generation changes)
   + Customized to project
Assessing induced VMT using elasticities:

\[ Elasticity = \frac{\%\Delta VMT}{\%\Delta \text{Lane Miles}} \]

\[ \%\Delta \text{Lane Miles} \times \text{Existing VMT} \times \text{Elasticity} = \text{Project VMT} \]
Assessing induced VMT using a travel demand model:

A travel demand model can estimate:
1. Longer trips
2. Mode shift toward automobile
3. Newly generated trips [in some cases]
4. Route changes

But not:
5. Land use changes
6. Newly generated trips [in some cases]
Assessing Induced Travel

OPR-recommended methods for incorporating land use changes, when using a travel demand model:

A. Use elasticities from the research directly
B. Adjust model results to align with empirical research
C. Employ an expert panel
D. Employ a land use model, iterate with travel model
Roadway Capacity Project Analysis in CEQA

Impact Assessment → Significance Determination
Roadway Capacity Project Analysis in CEQA

Induced Travel Analysis → Impact Assessment → Significance Determination

- Greenhouse Gasses
- Other Air Pollutants
- Noise
- Energy
- Transportation
Roadway Capacity Project Analysis in CEQA

Induced Travel Analysis → Impact Assessment → Significance Determination

Land Use Effects

- Greenhouse Gasses
- Other Air Pollutants
- Noise
- Energy
- Transportation
Roadway Capacity Project Analysis in CEQA

- Induced Travel Analysis
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- Greenhouse Gasses
- Other Air Pollutants
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- Energy
- Transportation

- Land Use Effects
- Impact Assessment
- Significance Determination

- Habitat
- Agriculture
- Water Use/Quality/Flood Risk
Roadway Capacity Project Analysis in CEQA

Induced Travel Analysis → Impact Assessment → Significance Determination

Land Use Effects → Impact Assessment → Significance Determination

- Greenhouse Gasses
- Other Air Pollutants
- Noise
- Energy
- Transportation

- Habitat
- Agriculture
- Water Use/Quality/Flood Risk
Does SB 375 account for induced travel?
Does SB 375 account for induced travel?

Transportation investments affect:
1. Trip length
2. Mode shift
3. Trip generation
4. Route changes
5. Land use patterns
SB 375 and Induced Travel

Does SB 375 account for induced travel?

Transportation investments affect:
1. Trip length
2. Mode shift
3. Trip generation
4. Route changes
5. Land use patterns

Under SB 375, RTP-SCSs contain:
- A constrained program of transportation investment
- A non-binding land use vision
Does SB 375 account for induced travel?

Transportation investments affect:
1. Trip length
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4. Route changes
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Under SB 375, RTP-SCSs contain:
- A constrained program of transportation investment
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What effect will the transportation investments have on actual land use development?
SB 375 and Induced Travel

Does SB 375 account for induced travel?

Transportation investments affect:
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2. Mode shift
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Must be analyzed at project level

What effect will the transportation investments have on actual land use development?
SB 375 and Induced Travel

Does SB 375 account for induced travel?

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Under SB 375, RTP-SCSs contain:
- A constrained program of transportation investment
- A non-binding land use vision

Must be analyzed at project level
- What effect will the transportation investments have on actual land use development?
- What mitigation is feasible at the project level?
Adoption of VMT Across California
Resources on OPR Website
Transportation Impacts (SB 743)

CEQA Guidelines Update and Technical Advisory

After over four years of stakeholder-driven development through nearly 250 stakeholder meetings, public comment sessions, and outreach events, OPR has released its proposed CEQA Guideline Implementing Senate Bill 743 to the California Natural Resources Agency. OPR has also prepared a Technical Advisory on Evaluating Transportation Impacts in CEQA, which contains OPR's technical recommendations regarding assessment of VMT, thresholds of significance, and mitigation measures. OPR may update or supplement this technical advisory in response to new information and advances in modeling and methods. Both of these documents can be accessed through the following links:

» Proposed CEQA Guideline Implementing SB 743 (Section 15046.9)

» Technical Advisory on Evaluating Transportation Impacts in CEQA (2017)

Notice of future activity on the CEQA Guideline will be posted on OPR's website and distributed through the CEQA Guideline List Serve. Please sign up on the List Serve to stay connected. The Natural Resources Agency will also post updated information about the rulemaking process on its website.

OPR developed the proposed updates related to transportation analysis separately from the rest of the CEQA Guidelines update. That proposal has been included in the Proposed Updates to the CEQA Guidelines. For more information on the comprehensive package, please visit Current CEQA Guidelines Update.

» Frequently Asked Questions

Key Resources on SB 743: Studies, Reports, Briefs, and Tools

This resource page will be updated as new resources become available. Last updated: September 29, 2017

- Transportation Metrics: Disadvantages of LOS and Auto Delay
- Environmental, Health, Fiscal Benefits of VMT Reduction
- VMT Reduction Strategies
- Induced VMT from Highway Capacity
- Automated Vehicles and VMT
- Tools to measure VMT and Access to Destinations
- Housing Affordability and VMT
- VMT Reduction in Rural Areas
- Roadway Pricing
- Traffic Safety

Address any questions regarding the key resources to chris.ganson@opr.ca.gov.

What Is SB 743?

Governor Brown signed Senate Bill 743 (SB 743) (Steinberg, 2018), which creates a process to change the way that transportation impacts are analyzed under CEQA. Specifically, SB 743 requires OPR to amend the CEQA Guidelines to provide an alternative to LOS for evaluating transportation impacts. Particularly within areas served by transit, these alternative criteria must promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses (Public Resources Code Section 15046.6(b)(1)). Measurement of transportation impacts may include “vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation...”
What is SB 743?

Governor Brown signed Senate Bill (SB) 743 (Steinberg, 2013), which creates a process to change the way that transportation impacts are analyzed under CEQA. Specifically, SB 743 requires OPR to amend the CEQA Guidelines to provide an alternative to LOS for evaluating transportation impacts. Particularly within areas served by transit, those alternative criteria must “promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity
Transportation Metrics: Disadvantages of LOS and Auto Delay


- Primer: The difference between accessibility and mobility (Susan Handy, Access Journal, 5p): Highway Blues: Nothing a Little Accessibility Can’t Cure

- Study: Pursuit of high LOS grades worsens transportation and lessens economic activity in Southern California (UCLA Lewis Center and UCLA Institute of Transportation Studies, 12p Executive Summary, 80p academic study): Congested Development: A Study of Traffic Delays, Access, and Economic Activity in Metropolitan Los Angeles

- Study: Pursuit of high LOS grades worsens transportation and lessens economic activity in Northern California (UCLA Lewis Center and UCLA Institute of Transportation Studies, 10p Executive Summary, 99p academic study): Not So Fast: A Study of Traffic Delays, Access, and Economic Activity in the San Francisco Bay Area


- Report: Problems with reliance on metrics of auto mobility and delay (Joe Cortright, Impresa and CEOs for Cities)
  - Executive summary (17p): A Critique of Mobility Measures and a Synthesis: How sprawl is lengthening our commutes and why misleading mobility measures are making things worse

- Report: Potential to reduce petroleum reliance through updating LOS metric (Summary 1p, report 9p): Unraveling Petroleum: Use of Performance Measures that Prioritize Automobiles over Other Modes in Congested Areas
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Environmental, Health, Fiscal Benefits of VMT Reduction

- Report: VMT reduction for better fiscal and financial outcomes (Short Summary, 4p; Executive Summary 10p, Report 79p): Growing Wealthier: Smart Growth, Climate Change, and Prosperity
- Report: Benefits of physical activity and the role of the built environment and air pollution (California Air Resources Board, 63p): Physical Activity: Health Benefits, the Role of the Built Environment and Impacts of Air Pollution
- Report: Cataloging pavement maintenance backlog in California (Ron Milam, Fehr and Peers, 3p): Protecting Our Transportation Investment
- Study: Reduction in cardiovascular disease, cancer, and general mortality associated with commuting by active transit (British Medical Journal, 7p): Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study

VMT Reduction Strategies

- Induced VMT from Highway Capacity
- Automated Vehicles and VMT
Transportation Metrics: Disadvantages of LOS and Auto Delay

Environmental, Health, Fiscal Benefits of VMT Reduction

VMT Reduction Strategies

- Academic Review: VMT reduction potential from previously-researched strategies in California (Susan Handy and Marlon Boarnet, Prepared for the California Strategic Growth Council, 2p Executive Summary, 39 p. study): A Framework for Projecting the Potential Statewide VMT Reduction from State-Level Strategies in California

- Manual: Implementing research on VMT and GHG reduction from various strategies (research and methods underlying the CalEEMod tool - California Air Pollution Control Officers’ Association (CAPCOA), see pp 159-331): Quantifying Greenhouse Gas Mitigation Measures (A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures)

- Report: Review of research on the relationship between urban development, VMT, and transportation CO2; evidence of the need for VMT reduction; efficacy of compact development for achieving GHG reductions. (Executive Summary 11p, Report 135p) Growing Cooler: The Evidence on Urban Development and Climate Change


- Study: VMT effects of land use and transport system characteristics (Institute of Transportation Studies, Executive Summary 2p, academic study 99p): Quantifying the effect of local government actions on VMT

- California Air Resources Board Briefs on GHG (and VMT) reductions from Carsharing, Parking Pricing, Road User Pricing, Employer-Based Trip Reduction Programs and Vanpools, Pedestrian Strategies, Bicycling Strategies, Transit Service Strategies, Telecommuting, and Voluntary Travel Behavior Change Programs.
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Induced VMT from Highway Capacity

- Academic Article: History of the failure of transportation profession to account for induced VMT (The Planning Review, 8p): "You Can't Build Your Way Out of Congestion." - Or Can you?
- Article, Transportation Research Record: Background on improving methods for assessment of the VMT effects of roadway capacity projects (Milam et al., Transportation Research Record, Transportation Research Board, National Academy of Sciences, 6p): Closing the Induced Vehicle Travel Gap Between Research and Practice
- Article: Adding highway capacity is not a GHG reduction strategy (City Observatory, Joe Cortright, 6p) Urban myth busting: Congestion, idling, and carbon emissions
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Automated Vehicles and VMT

- Brief: Potential effects of automated vehicles on VMT and GHGs, and policies to address them (UC Davis Institute of Transportation Studies, 4p): Keeping Vehicle Use and Greenhouse Gas Emissions in Check in a Driverless Vehicle World
- Brief: Suggested land use and transportation policies to address the advent of driverless vehicles (UC Davis Institute of Transportation Studies, 7p): Land Use and Transportation Policies
- Briefs: Additional policy briefs on automated vehicles and climate, active transportation, transit, equity, and governance can be found here.

Tools to measure VMT and Access to Destinations

Housing Affordability and VMT

VMT Reduction in Rural Areas

Roadway Pricing

Traffic Safety

Address any questions regarding the key resources to chris-gpeng@opr.ca.gov
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Tools to measure VMT and Access to Destinations

▶ VMT Modeling Tool: CalEEMod
  ○ Model website and download: California Emissions Estimator Model (CalEEMod)
  ○ OPR recommendations for using CalEEMod for VMT assessment (Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA case study pp. 47-52)
  ○ California Statewide Travel Demand Model VMT and trip length data: Caltrans SB 743 VMT Impact Assessment webpage


▶ Accessibility Modeling Tool: GIS-based tool for measuring access to destinations, including assessing the effect of infrastructure investment options on accessibility. Citilabs Sugar Access

▶ Accessibility Assessment Tool: Maps existing accessibility. US EPA Smart Location Database
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Housing Affordability and VMT


- Tool: Index of combined affordability of transportation and housing (Center for Neighborhood Technology): Housing and Transportation Affordability Index

VMT Reduction in Rural Areas

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What is SB 7432
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VMT Reduction in Rural Areas

- Report: Strategies for maintaining open space, helping towns thrive, and creating great new places in rural areas (32p): Putting Smart Growth to Work in Rural Communities
- Transportation Research Record Article: VMT reduction in rural areas (Miller et. al., 9p): Mitigating Vehicle-Miles Traveled in Rural Development

Roadway Pricing

Traffic Safety

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What is SB 743?
Transportation Metrics: Disadvantages of LOS and Auto Delay

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VMT Reduction in Rural Areas

Roadway Pricing

- Article: Roadway congestion can be solved through pricing mechanisms (Access Magazine, Spring 2017, 4p): Traffic Congestion Is Counter-Intuitive, and Fixable
- Article: Equity of peak period road pricing (City Observatory, Joe Cortright, 4p): Transportation equity: Why peak period road pricing is fair

Traffic Safety
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- Literature Review and Guidance: Systematic consideration of roadway safety (Governor’s Office of Planning and Research, 14p): General Plan Guidelines, Appendix B, SB 743 Safety Technical Advisory

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What is SB 743?

Governor Brown signed Senate Bill (SB) 743 (Steinberg, 2013), which creates a process to change the
THE DEATH AND LIFE OF GREAT AMERICAN CITIES

JANE JACOBS

“Perhaps the most influential single work in the history of town planning... a work of literature.”
—The New York Times Book Review
Chapter Four: “Science Abandoned”

Persistent failure of transportation professions to understand and act upon:

• Access to destinations (not mobility) is the purpose of transportation
• Induced travel results from roadway capacity increase
Thanks!

chris.ganson@opr.ca.gov

Research and resources on the OPR website:

http://opr.ca.gov/ceqa/updates/sb-743/index.html#KeyResources