

VMT Calculator - Using TDF Model to Build Sketch Models for Land Use Review

SCAG Modeling Task Force Meeting
March 24, 2021

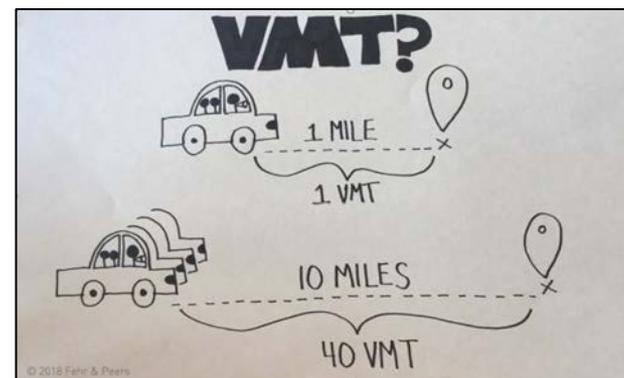


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Outline

- Why VMT?
- What is the LA VMT Calculator?
- How does the VMT Calculator relate to the City of LA travel demand model and the SCAG travel demand model?
- Next steps



California Senate Bill (SB) 743

- State OPR issued final guidance December 2018
- Los Angeles City Council adopted VMT July 30, 2019
- New projects must analyze transportation impacts with **VMT** and reference the updated **LADOT Transportation Assessment Guidelines**
- State deadline to comply was **July 1, 2020**



CALIFORNIA REPUBLIC

VMT is Aligned with State & Local Goals



Reduction in GHGs



Multimodal mobility networks



Diversity of land uses



Mobility Plan 2035 and LA's Green New Deal goals



New Metric: Vehicle Miles Traveled (VMT)



Number of
automobile trips

X



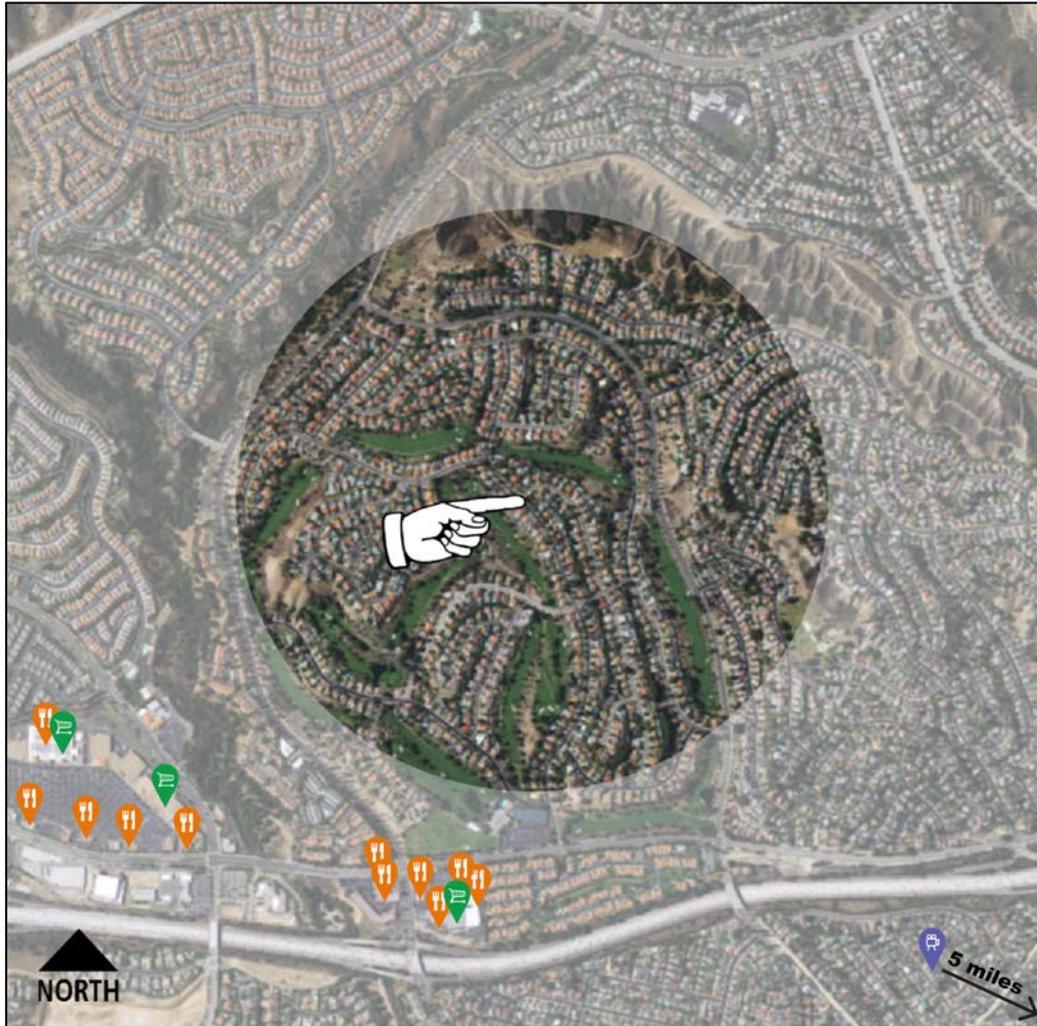
Number of
miles driven

=



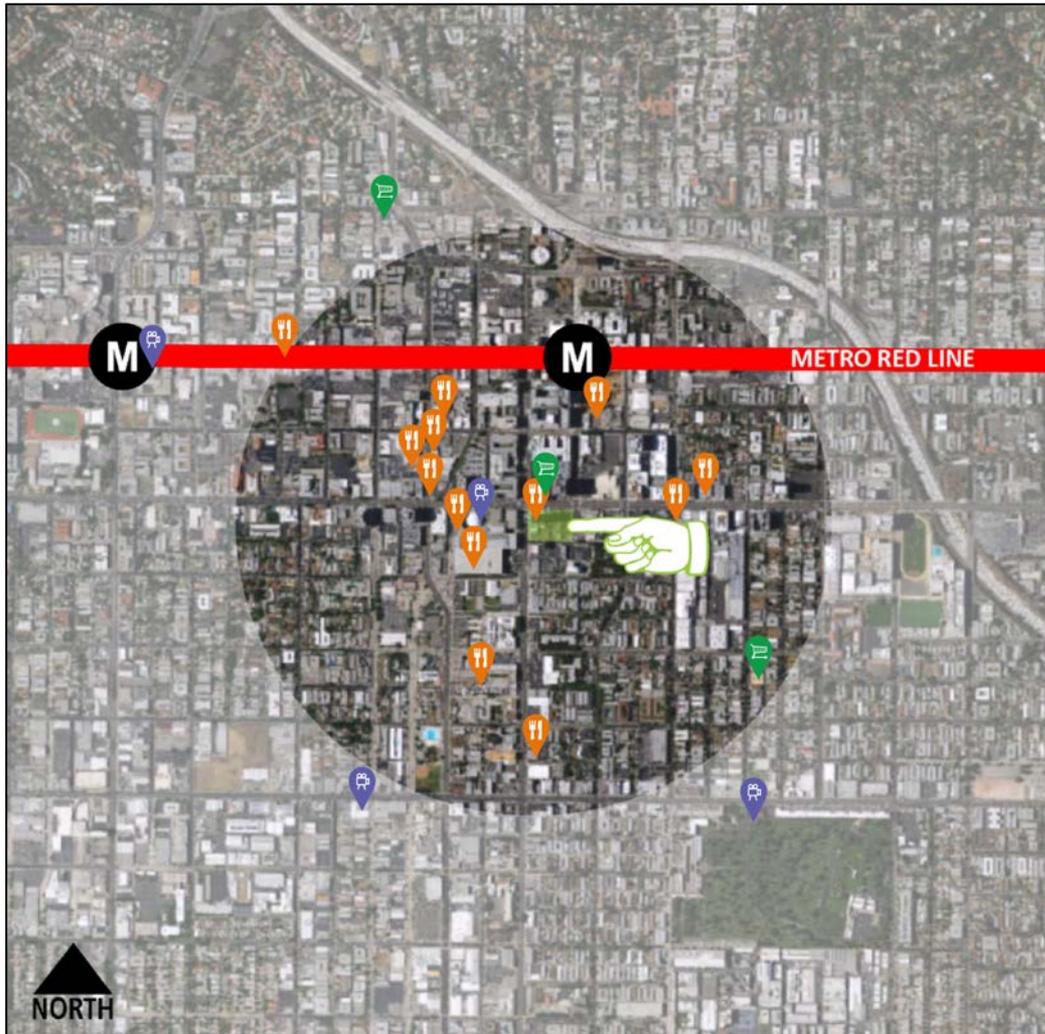
Vehicles Miles
Traveled

Former Metric: Relied on Vehicle Delay



Development Review Metric	Outcome
Level of Service (LOS)	A (Free Flow)
Vehicle Miles Traveled (VMT)	High

New Metric: VMT Supports Location Efficiency



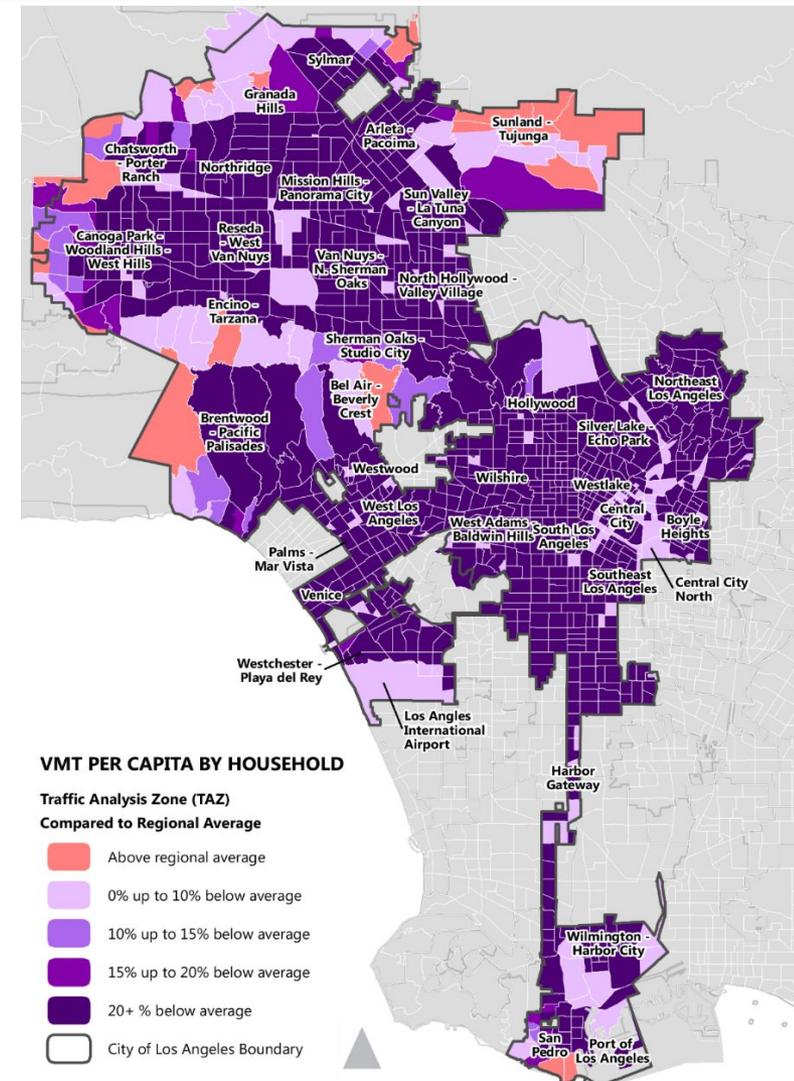
Development Review Metric	Outcome
Level of Service (LOS)	F (Delay)
Vehicle Miles Traveled (VMT)	Low

New development in area with land-use diversity

Los Angeles' Approach

Developed local VMT thresholds that are lower than the region's to align with LA Mobility Plan 2035 goals to decrease VMT within the City

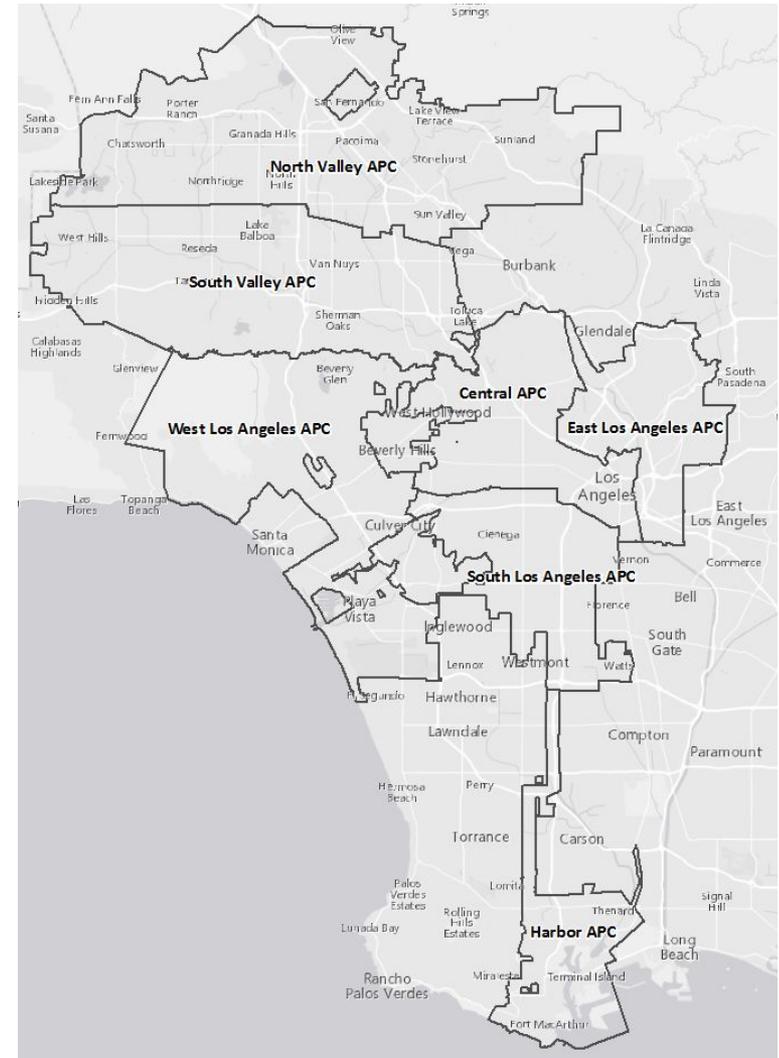
Geography	VMT per capita	VMT per employee
SCAG	17.2	21.3
City of LA	9.3	12.9



Los Angeles' Approach

Developed local VMT thresholds that are context sensitive

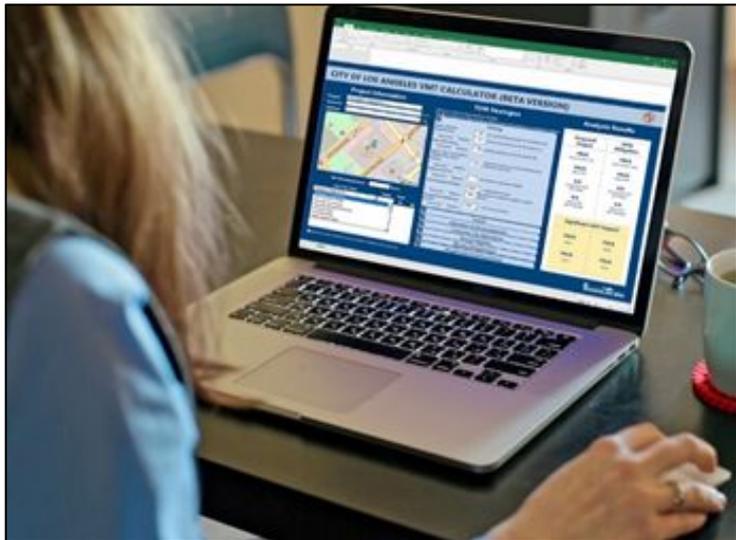
Area Planning Commission	VMT per capita	VMT per employee
Central	6.0	7.6
East LA	7.2	12.7
Harbor	9.2	12.3
North Valley	9.2	15.0
South LA	6.0	11.6
South Valley	9.4	11.6
West LA	7.4	11.1



Los Angeles' Approach

Developed VMT Calculator to analyze project impacts

- Requires address, use and intensity inputs
- Estimates daily trips and VMT
- Reports significant impacts
- Allows selection of VMT-reducing mitigation measures and calculates effectiveness



Project Information

Project:

Scenario:

Address:

[www](#)

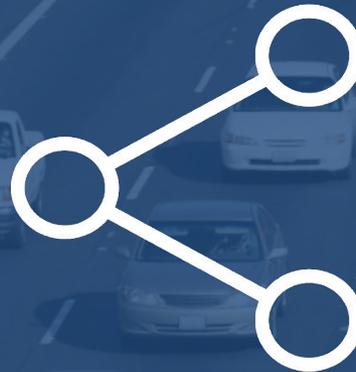
Analysis Results	
Proposed Project	With Mitigation
6,042 <small>Daily Vehicle Trips</small>	3,891 <small>Daily Vehicle Trips</small>
44,799 <small>Daily VMT</small>	28,845 <small>Daily VMT</small>
7.4 <small>Household VMT per Capita</small>	4.8 <small>Household VMT per Capita</small>
11.3 <small>Work VMT per Employee</small>	7.2 <small>Work VMT per Employee</small>
Significant VMT Impact?	
Household: Yes <small>Threshold = 6.2 15% Below APC</small>	Household: No <small>Threshold = 6.2 15% Below APC</small>
Work: No <small>Threshold = 11.8 15% Below APC</small>	Work: No <small>Threshold = 11.8 15% Below APC</small>



**Affordable
housing & mixed
use vehicle trip
adjustments**



**Localized trip
generation rates
& VMT**



**Travel Demand
Forecasting
(TDF) Model**

VMT Calculator Trip Generation

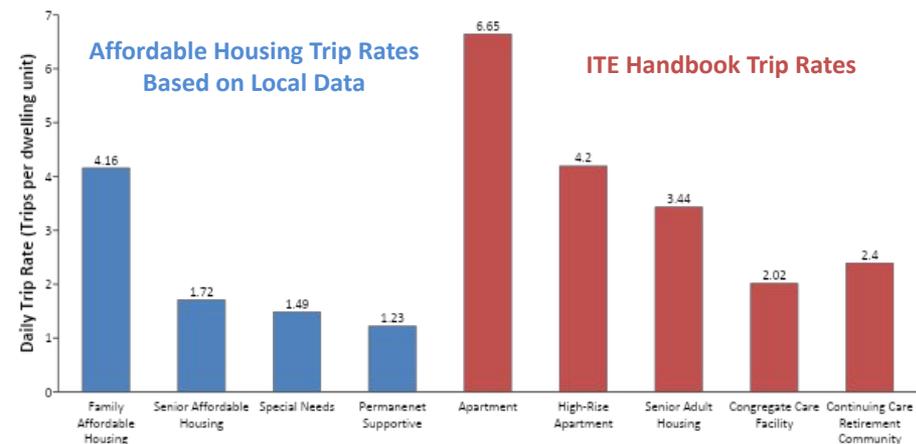
- Starts with ITE trip generation factors
- Calculator applies US EPA MXD methodology to consider various socioeconomic and built environment factors, including:
 - Relative number of residents and jobs
 - Density of development
 - Walking and driving connectivity
 - Availability of transit
 - Convenient trip destinations within immediate area
 - Vehicle ownership
 - Household size



7Ds That influence Trip Generation (and VMT)

VMT Calculator Trip Generation

- Custom trip rates developed from local vehicle trip data collected for 42 affordable housing sites in the City
- Calculator validated to local vehicle trip data collected at the 42 affordable housing sites plus 51 market-rate housing, office, and mixed-use sites in the City



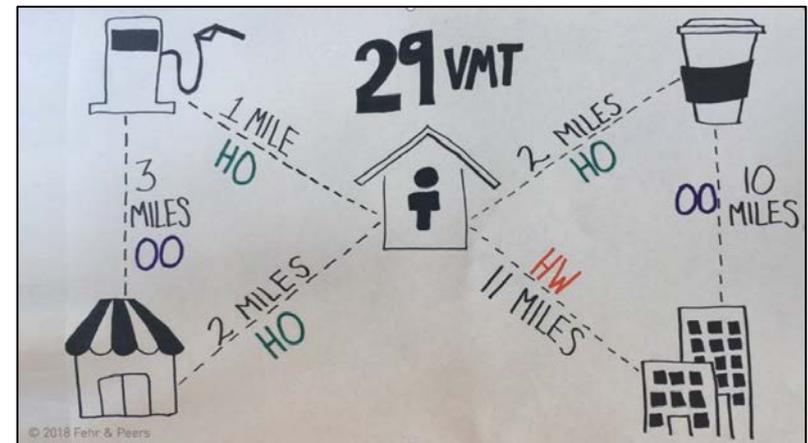
VMT Calculator Relation to Travel Demand Model

- Calculator obtains the following inputs to the MXD model from the LA travel demand model:
 - Intersections per square mile
 - Population within one mile
 - Employment within one mile
 - Vehicles per household
 - Transit mode splits by trip purpose



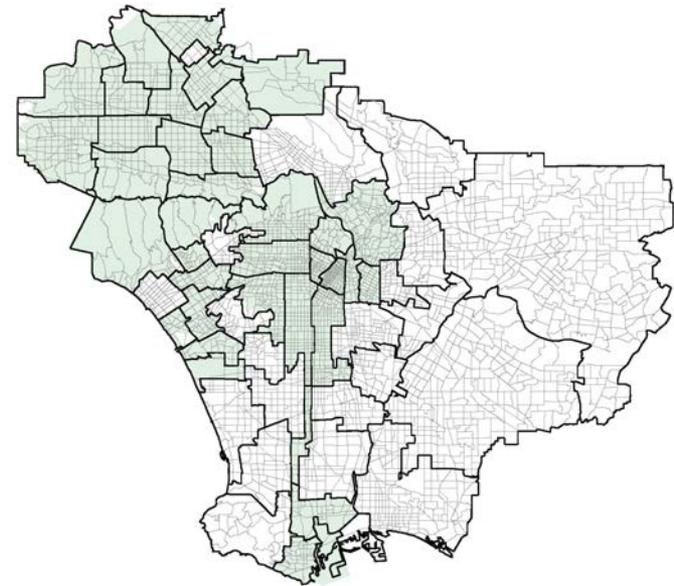
VMT Calculator Relation to Travel Demand Model

- Calculator obtains vehicle trip lengths by trip purpose from the LA travel demand model for VMT calculation
 - HBW, HBO & NHB Productions
 - HBW, HBO & NHB Attractions
- Trip length data averaged for the TAZ and TAZs within $\frac{1}{8}$ mile of the project



City of LA Travel Demand Model

- Subregional child of SCAG RTP/SCS 2016 model
- Used by City as part of Community Plan update process
- Used by City to evaluate transportation system improvements
- Provides inputs to VMT Calculator



City of LA Travel Demand Model Development

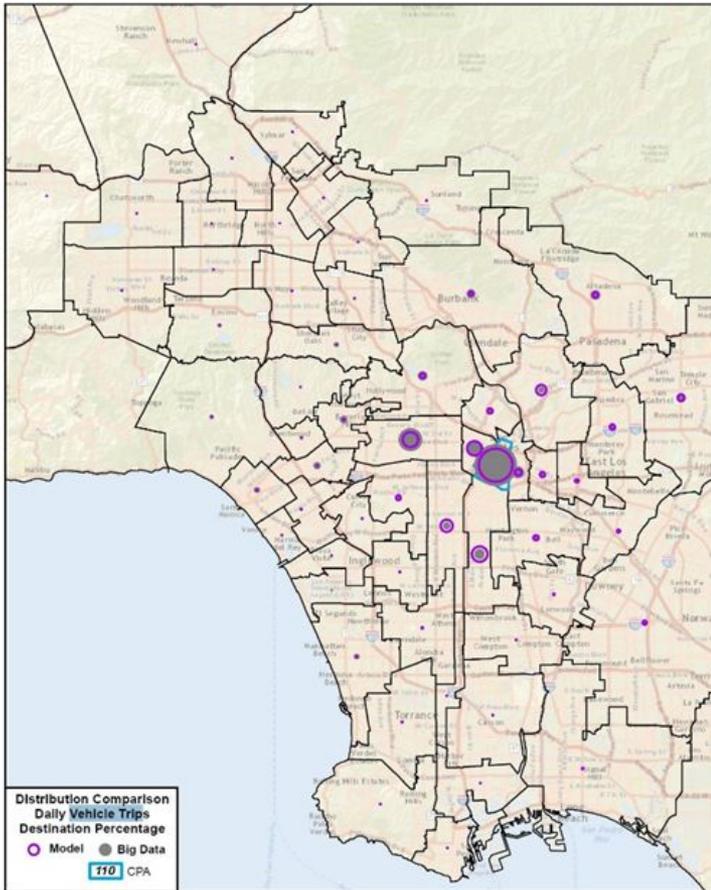
Redefined the model's network and transportation analysis zones (TAZ)

- Imported the City's street network file
- Further detailed the transit network
- Redefined SCAG's TAZ layer based on the City's arterial network
- Provides more detailed route choice to inform accurate VMT output

Zone ID	Zone Type
1-7	Mega region buffers
8-12	Spare
13-4029	Focus area
4030-4109	Spare
4110-4149	External stations
4150-4161	Airport
4162-4192	Seaports

City of LA Travel Demand Model Development

Central City



Used big transportation data to validate trip length estimation

- Calibrated trip distribution using empirical origin destination (O-D) data
- Validated with archival 24-hr loop detector data

VMT Mitigation Measures: TDM



Parking Management

- Reduce parking supply
- Unbundle parking
- Parking cash-out
- Price workplace parking
- Residential area parking permits



Transit

- Reduce transit headways
- Neighborhood shuttle
- Transit subsidies



Education & Marketing

- Voluntary travel behavior change program
- Promotions & marketing



Commute Trip Reductions

- Required commute trip reduction program
- Alternative work schedules/telecommute
- Vanpool or shuttle
- Rideshare



Shared Mobility

- Car share
- Bike share
- School carpool



Bicycle Infrastructure

- Improve bicycle facility
- Bike parking
- Secure bike parking & showers



Neighborhood Enhancement

- Traffic calming improvements
- Pedestrian improvements

VMT Mitigation Measures: TDM

Quantifying TDM Effectiveness

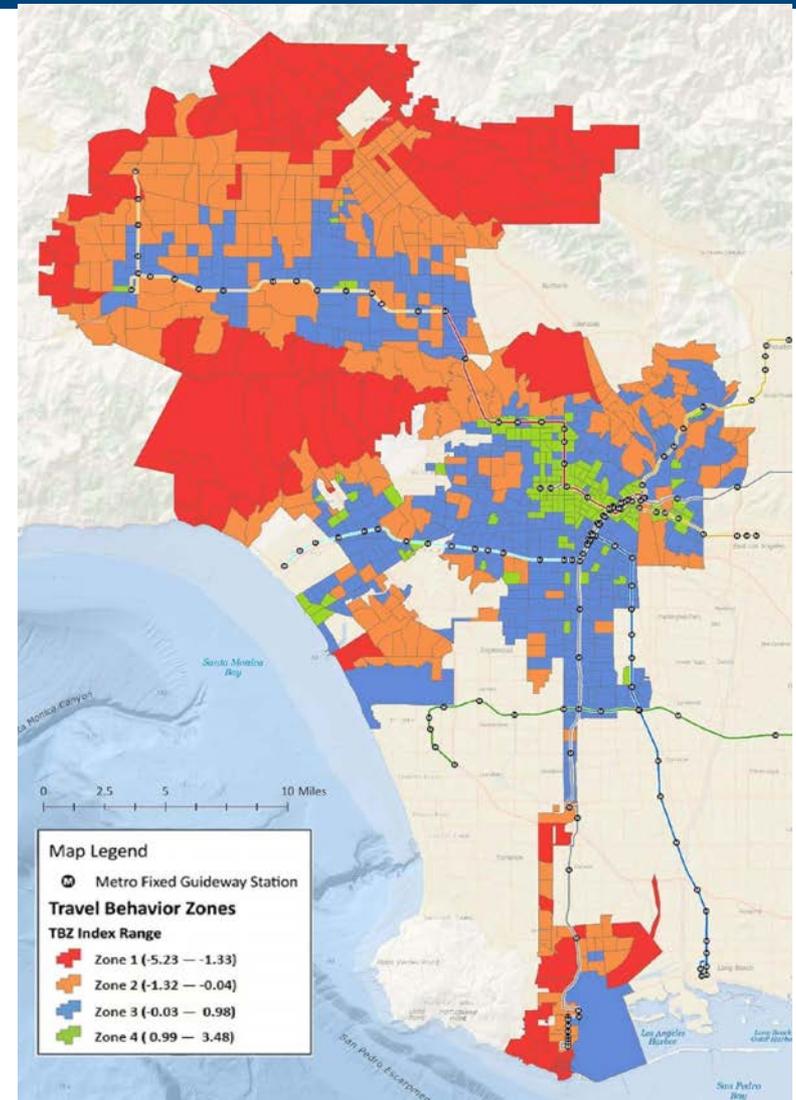
- TDM effectiveness based primarily on research in CAPCOA's Quantifying GHG Mitigation Measures report
- Classified the City into four Travel Behavior Zones (TBZ) informed by six factors that inform travel in the built environment
- Aligned with CAPCOA Location Settings

Map Legend

⊕ Metro Fixed Guideway Station

Travel Behavior Zones

	Suburban (15% VMT Reduction Cap)
	Suburban Center (20% VMT Reduction Cap)
	Compact Infill (40% VMT Reduction Cap)
	Urban (75% VMT Reduction Cap)



VMT Mitigation Measures: TBZ Factors

Variable	Data Source
Population density	American Community Survey
Daytime population density	Census & American Community Survey
Land use diversity score	LA County Assessor tax roll
Intersection density	LA BOE street centerline
Distance to nearest fixed guideway bus stop or rail station	Metro
Distance to nearest major bus stop	Metro

Suburban

Suburban Center

Compact Infill

Urban



Low population density
 Low daytime population density
 Homogenous land uses
 Low intersection density
 Long distance from fixed guideway bus stop or station
 Long distance from nearest major bus stop

High population density
 High daytime population density
 Heterogenous land uses
 High intersection density
 Short distance from fixed guideway bus stop or station
 Short distance from nearest major bus stop

VMT Calculator Dashboard

CITY OF LOS ANGELES VMT CALCULATOR Version 1.3

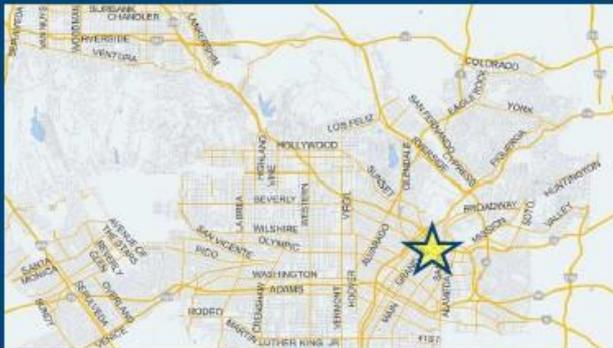


Project Information

Project:

Scenario:

Address:



Proposed Project Land Use Type	Value	Unit
Housing Multi-Family	450	DU
Retail General Retail	20	ksf
Retail High-Turnover Sit-Down Restaurant	20	ksf
Office General Office	100	ksf
Housing Affordable Housing - Family	50	DU

TDM Strategies

Select each section to show individual strategies
 Use to denote if the TDM strategy is part of the proposed project or is a mitigation strategy

	Proposed Project	With Mitigation
Max Home Based TDM Achieved?	No	No
Max Work Based TDM Achieved?	No	No

A **Parking**

Reduce Parking Supply city code parking provision for the project site
 Proposed Prj Mitigation actual parking provision for the project site

Unbundle Parking Proposed Prj Mitigation monthly parking cost (dollar) for the project site

Parking Cash-Out Proposed Prj Mitigation percent of employees eligible

Price Workplace Parking Proposed Prj Mitigation daily parking charge (dollar)
 percent of employees subject to priced parking

Residential Area Parking Permits Proposed Prj Mitigation cost (dollar) of annual permit

B **Transit**

C **Education & Encouragement**

D **Commute Trip Reductions**

E **Shared Mobility**

F **Bicycle Infrastructure**

G **Neighborhood Enhancement**

Analysis Results

Proposed Project	With Mitigation
3,832 Daily Vehicle Trips	3,532 Daily Vehicle Trips
28,666 Daily VMT	26,259 Daily VMT
4.0 Household VMT per Capita	3.4 Household VMT per Capita
9.6 Work VMT per Employee	7.4 Work VMT per Employee

Significant VMT Impact?	
Household: No Threshold = 6.0 15% Below APC	Household: No Threshold = 6.0 15% Below APC
Work: Yes Threshold = 7.6 15% Below APC	Work: No Threshold = 7.6 15% Below APC

VMT Calculator Report Sample

CITY OF LOS ANGELES VMT CALCULATOR

Report 4: MXD Methodology

Date: July 9, 2019

Project Name: Sample Mixed-Use Project in Panorama

Project Scenario:

Project Address:



Version 1.0

MXD Methodology - Existing Without TDM

	Unadjusted Trips	MXD Adjustment	MXD Trips	Average Trip Length	Unadjusted VMT	MXD VMT
Home Based Work Production	677	-21.1%	534	8.7	5,857	4,641
Home Based Other Production	1,813	-30.2%	1,266	5.6	10,214	7,137
Non-Home Based Other Production	822	-10.7%	734	7.6	6,248	5,585
Home-Based Work Attraction	1,305	-16.5%	1,089	14.5	18,936	15,821
Home-Based Other Attraction	2,137	-30.0%	1,495	5.2	11,027	7,722
Non-Home Based Other Attraction	1,004	-10.4%	900	9.8	9,808	8,792

MXD Methodology with TDM Measures

	Proposed Project			Project with Mitigation Measures		
	TDM Adjustment	Project Trips	Project VMT	TDM Adjustment	Mitigated Trips	Mitigated VMT
Home Based Work Production	-0.0%	534	4,641	-17.8%	439	3,815
Home Based Other Production	-0.0%	1,266	7,137	-17.8%	1,040	5,866
Non-Home Based Other Production	-0.0%	734	5,585	-6.6%	686	5,217
Home-Based Work Attraction	-0.0%	1,089	15,821	-20.0%	871	12,657
Home-Based Other Attraction	-0.0%	1,495	7,722	-6.6%	1,397	7,213
Non-Home Based Other Attraction	-0.0%	900	8,792	-6.6%	840	8,212

MXD VMT Methodology Per Capita & Per Employee

Total Population: 1,127

Total Employees: 900

APC: North Valley

	Proposed Project	Project with Mitigation Measures
Total Home Based Production VMT	11,778	9,681
Total Home Based Work Attraction VMT	15,821	12,657
Total Home Based VMT Per Capita	10.5	8.6
Total Work Based VMT Per Employee	17.6	14.1

Project Example

500 Units
 5 ksf Retail
 10 ksf High-Turnover Restaurant

Project Outcome: LOS

- 15 impacted intersections
- Lane restriping at two intersections
- 13 intersections remain significant
- TDM Plan required
- Full EIR

Project Outcome: VMT

- Work VMT not significant
- Household VMT above the APC threshold
- Household VMT can be fully mitigated through TDM
- VMT impact does not trigger an EIR

VMT Calculator Analysis Results

Proposed Project	With Mitigation
2,858 Daily Vehicle Trips	2,295 Daily Vehicle Trips
18,923 Daily VMT	15,233 Daily VMT
9.5 Household VMT per Capita	7.3 Household VMT per Capita
7.6 Work VMT per Employee	6.5 Work VMT per Employee
Significant VMT Impact?	
Household: Yes Threshold = 7.4 15% Below APC	Household: No Threshold = 7.4 15% Below APC
Work: No Threshold = 11.1 15% Below APC	Work: No Threshold = 11.1 15% Below APC

Next Steps for Los Angeles

1. TDM Ordinance

2. VMT Research

- Post-Pandemic Trends
- Parking
- Infrastructure
- Mobility Services
- Monitor Development TDM Effectiveness

3. Off Site Mitigation

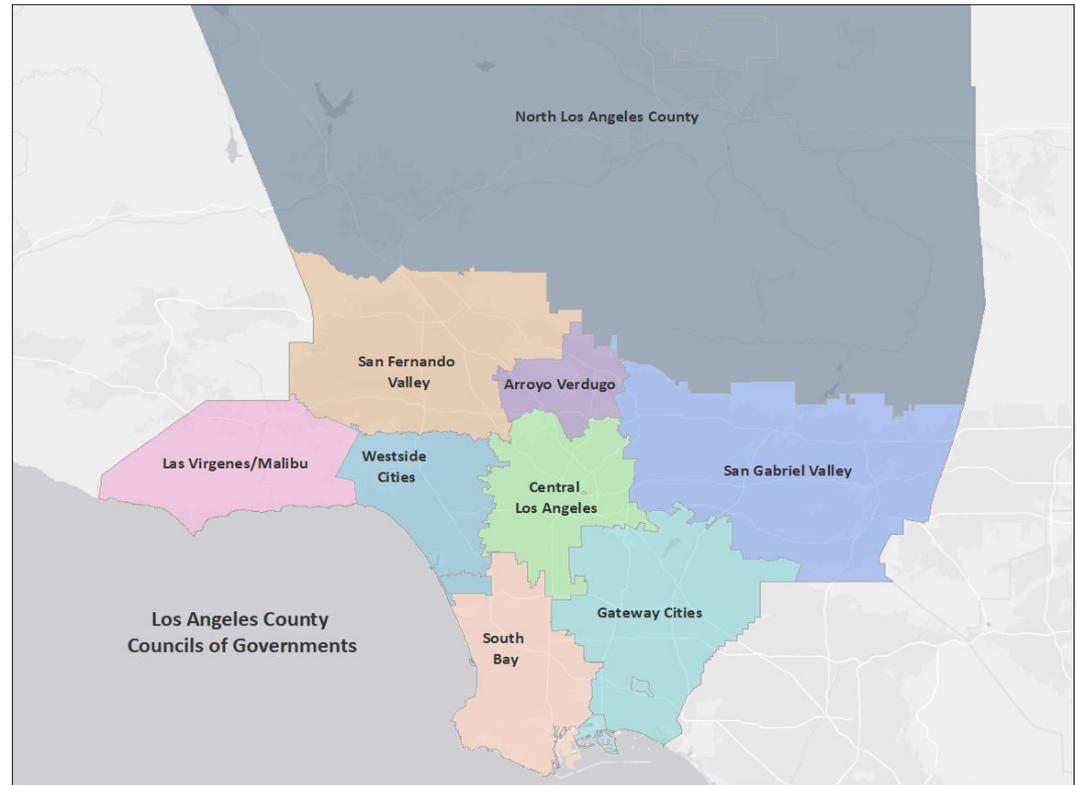
- Transportation Specific Plans
- VMT Mitigation Exchange/Bank

4. Leap to ABM Model?

Next Steps for Regional Transition to VMT

Look to MPOs and Council of Governments (COGs)

1. Expand VMT Calculator to other jurisdictions
2. Validate COG-level TDF Models?
3. Establish COG-level Thresholds?



QUESTIONS

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Go to:

<https://ladot.lacity.org/businesses/development-review>

[#transportation-assessment](#)

