Using Travel Models
- and other Tools to Understand How We Move in Sonoma County
October 23, 2019
AGENDA

01  Introduction/Overview
02  Travel Demand Models
03  Predicting Future Travel Conditions
04  Examining Existing Conditions
05  Analyzing Future Growth Patterns
About the Comprehensive Transportation Plan

The SCTA is embarking on the next update of the Sonoma County Comprehensive Transportation Plan (CTP) to examine transportation needs and revisit our vision for transportation throughout Sonoma County.
Other opportunities

Transportation Needs Listening Sessions

- **Windsor**, Mon 11/4, 6-7pm at the Windsor Regional Library
- **Santa Rosa**, Wed 11/6, 6-7pm at the Central Santa Rosa Library
- **Petaluma**, Mon 12/4, 6:45-7:45pm at the Petaluma Regional Library
- **Sonoma**, Mon 12/11, 6-7pm at the Sonoma Valley Regional Library

More info: [scta.ca.gov/2050](https://scta.ca.gov/2050)
Travel Demand Models
What is a travel model?

1. Definition:

   A computer program that runs mathematical equations using input data to replicate travel choices that individuals make.

2. The output is a measure of travel demand expressed in terms of traffic volumes, travel flows, and other measures of travel activity.


   • Where are people traveling to and from?
   • What routes are they choosing to get there?
   • How will people travel? By car, by bus, walking, biking?
The Model is a Tool

The model uses mathematical representations of travel behavior, the transportation system, and where people and travel destinations are located to replicate travel conditions.

Model output should be interpreted by engineers and planners, and adjusted and revised where necessary.
Why do we have a travel model?

- To analyze countywide transportation impacts of future growth
- Analyze impacts/benefits of regional projects
- Analyze performance of CTP and CTP projects
- Provide modeling output, data, and analysis for SCTA’s member organizations
What is SCTA’s role in modeling?

- **Maintain the countywide model**
  - Model inputs
  - Model validation

- **Regional Coordination**
  - Modeling best practices
  - Consistency
  - How should we analyzing new and emerging technologies?

- **Data Gathering**
  - Travel
  - Demographics
  - Travel flows and trends

- **Forecasting**
  - travel conditions
  - Population and employment growth
How does the travel model work?

Population and Employment Locations

Transportation System

Travel Behavior

Travel Forecasts
Four-Step Regional Travel Demand Model

1. Land use data
2. Trip generation
3. Trip distribution
4. Mode choice
5. Trip assignment

Highway and transit networks → Zone-to-zone Travel times, Costs, etc.

Highway and transit trips

Traffic Volume forecasts

Congested Traffic Speeds
Two Models? – Base and Future

• **Two Time Frames (Two Models)**
  – Base Year (2010)
  – Forecast Year (2040)

• **Base Year Model**
  – Calibrated to Match Traffic Counts
  – Replicates Existing Conditions
  – Gives Confidence for Future Projections
  – Travel survey and other behavioral information used to ensure that estimates are reasonable.

• **Forecast or Planning Horizon Year (2040)**
  – Forecast Population, Employment, etc. (ABAG, Dept. of Finance, Local Planners)
  – Includes Planned Roadways and Development
Model Output

- Travel statistics (VMT, GHG, Congestion)
- Traffic/Transit Ridership forecasts along roadways/transit lines (daily, AM/PM Peak Hour).
- Average Vehicle Speeds
- Mode Shares (what travel modes are being used?)
- Information about where travelers are going
- Information on what types of trips they are making.
- Level of Service/congestion.
Travel Statistics

Summaries for Scenario CTPS_2

Average Trip Length, Time, Minutes

<table>
<thead>
<tr>
<th>Description</th>
<th>Minutes</th>
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<tbody>
<tr>
<td>Home-Work</td>
<td>24.61</td>
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<tr>
<td>Home-School</td>
<td>9.05</td>
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<tr>
<td>Home-Other</td>
<td>11.04</td>
</tr>
<tr>
<td>Non-Home</td>
<td>11.04</td>
</tr>
<tr>
<td>All Trips</td>
<td>11.27</td>
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</table>

Average Trip Length, Distance, Miles

<table>
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<tr>
<th>Description</th>
<th>Miles</th>
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<tbody>
<tr>
<td>Home-Work</td>
<td>18.09</td>
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<tr>
<td>Home-School</td>
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<td>Home-Other</td>
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<td>Non-Home</td>
<td>6.41</td>
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<tr>
<td>All Trips</td>
<td>8.38</td>
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Node Shares

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Percent Drive Alone</td>
<td>37.92</td>
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<tr>
<td>Percent Shared Ride</td>
<td>54.77</td>
</tr>
<tr>
<td>Percent Transit</td>
<td>0.53</td>
</tr>
<tr>
<td>Percent Walk/Bike</td>
<td>6.79</td>
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Travel Demand Models
Predicting Future Travel Conditions
Population and employment growth and the aging workforce impact future travel conditions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Employment</th>
<th>2010</th>
<th>2040</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>483,878</td>
<td>202,173</td>
<td>598,460</td>
<td>256,363</td>
<td>24% increase</td>
</tr>
</tbody>
</table>
Aging population in Sonoma County: 2010 – 2040 % of total population

Senior population expected to increase from 14% to over 20% of total population by 2040.
2010-2040 Growth: Transportation Performance Measures % Change from 2010 conditions.

We'd like to see things move in these directions.
What impact do CTP projects have on future travel conditions?
Can policy, technology, and behavior change help us meet CTP Goals?
Policy, Strategy, and Technology Impact on CTP Performance Measures

- VMT
- Congestion
- GHGs
- Active Mode Share
- Daily Collisions
- Avg. Trip Time
- HH Travel Costs

Comparison of 2040 Growth, 2040 Projects, 2040 Policies.
Sensitivity Test: Land Use Change.
100 Single Family Units in Rio Nido. Travel increases going to river area and adds 81 PM peak hour trips and 2,339 additional daily VMT.
Sensitivity Test: Land Use Change.
250,000 additional sq. ft. expansion of SR Plaza. Travel increases going to SR Plaza and adds 584 PM peak hour trips and 13,500 additional daily VMT.
Sensitivity Test: Roadway Network Change - Expanded Railroad Ave. Interchange. Travel increases on HWY 101 north of I/C and decreases South of I/C. Travel increases on Stony Point and Jewett south of I/C and decreases on nearby local roads.
Predicting Future Travel Conditions
Using Travel Data to Examine Current Travel Conditions
Data Sources

• **CalTrans PeMS** (Performance Measurement System): Uses information from in-road sensors to estimate:
  – Congestion (hours of delay)
  – Speeds
  – VMT

• **INRIX** congestion and speed estimates: Uses information collected from in-road sensors, anonymized mobile phone location data, connected vehicles, GPS locator services to estimate:
  – Real-time and historical speeds
  – Congestion (% of free flow speed)
  – Bottlenecks
Hwy 101 Hours of Delay, AM Cotati to Windsor - 2017

SB Delay

NB Delay
Multi-use Path –
Joe Rodota Trail
@ Merced
Using Travel Data to Examine Current Travel Conditions
Analyzing Future Growth Patterns
What could growth **look like** on the ground?
Where will growth be located and how dense will it be?
No UGB

Legend
- SMART Rail Station
- SMART Rail Route
- Urban Growth Boundary (UGB)
- Priority Development Areas (PDAs)

Land Development Category
- Urban
- Compact
- Standard
What are potential **impacts** of this growth? *(household water use)*
How could growth change access and mobility? (Walk access to parks)
How could growth change access and mobility? (*Transit access to jobs*)
Assessing fire risk and vulnerability of potential development
Next webinar

Potholes and pavement condition
Tuesday, December 10
11am

More info: scta.ca.gov/2050
QUESTIONS?

THANK YOU!

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