

Public Workshop

Level of Service and the County's Travel Demand Model



OCTOBER 10, 2016
6:30 – 8:00 PM

Purpose



On August 30, 2016, the Board directed staff to:

“Conduct Board workshops to address the traffic and circulation issues underlying Measure E”

Agenda



- Overview of TDM (Kimley-Horn)
- Overview of Major CIP/TIM Fee Program (Kittelsohn & Associates)
- Detailed discussion on LOS calculations (DKS Associates & Caltrans)
 - US 50 at the County Line
 - Volumes and Speed Data
- Questions & Comments

Agency Staff



- **El Dorado County**
 - Steve Pedretti, P.E. – CDA Director
 - Shawna Purvines – CDA Interim Assistant Director
 - Claudia Wade, P.E. – Senior Civil Engineer
 - Natalie Porter, P.E., T.E. – Traffic Engineer
 - Katie Jackson, P.E. – Transportation Planner

- **Caltrans**
 - Andrew Brandt, P.E. – Deputy District Director for Maintenance and Traffic Operations

Kimley Horn – Mike Schmitt

Firm Qualifications

- Founded in 1967 originally as a transportation firm
- More than 2,800 employees nationwide
- ENR Top 100 Design Firm
- Fortune Magazine Top 100 Places to Work

Mike Schmitt, AICP CTP, PTP, Senior Project Manager

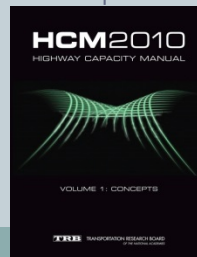
- Over 25 years of transportation planning experience
- Certified expert in transportation planning by both APA and TPCB
- National academies research experience
- Project manager for the El Dorado County Travel Demand Model Update



Kittelson & Associates – Mike Aronson

Firm Qualifications

- Specializes in transportation
- Primary authors of national references
 - *Highway Capacity Manual*
 - *Highway Safety Manual*
- Long-time support to El Dorado County
 - Peer review of development
 - Corridor safety (Green Valley Road)



Mike Aronson, P.E., Principal Engineer

- Over 30 years experience
- Travel forecasting, areawide analysis, traffic operations
- El Dorado County – Completed earlier version of model and deficiency analysis



DKS Associates – John Long

Firm Qualifications

- National firm specializing in transportation engineering and planning
- Over the last 27 years, has worked for every city and county in the greater Sacramento region and has not worked for any private developers

John Long, P.E., T.E., Principal

- 40 years of experience
- Developed regional travel demand models throughout US including SACOG (SACMET and SACSIM)
- Prepared traffic impact fee programs, CIPs and General Plan Updates for numerous counties and cities

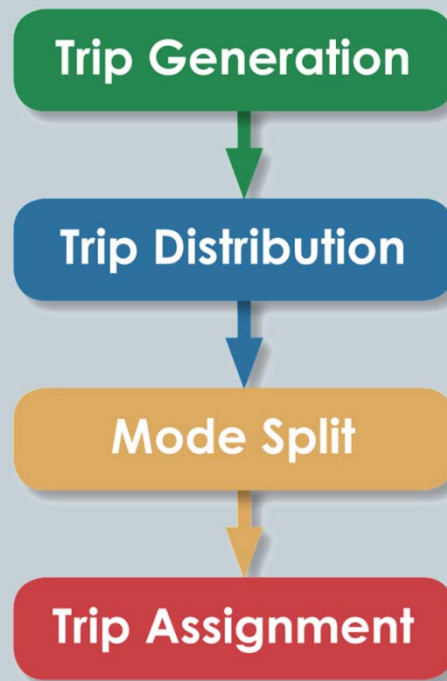
The logo for DKS Associates, featuring the letters "DKS" in a bold, white, sans-serif font on a black rectangular background.

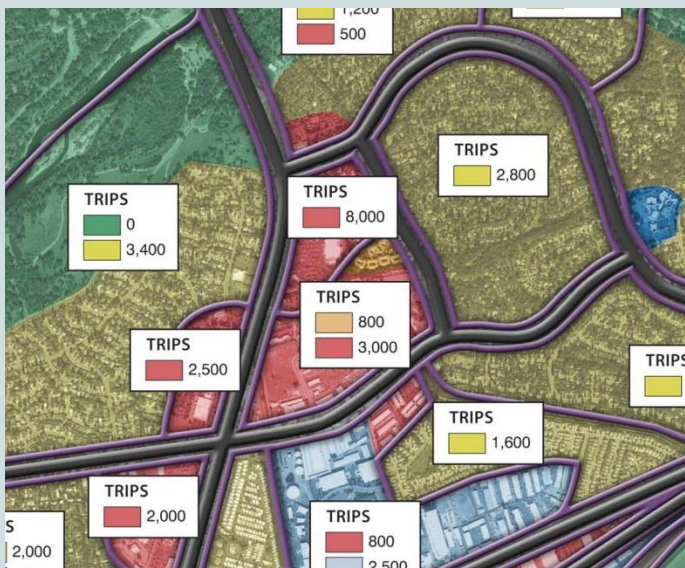
What is a Travel Demand Model?



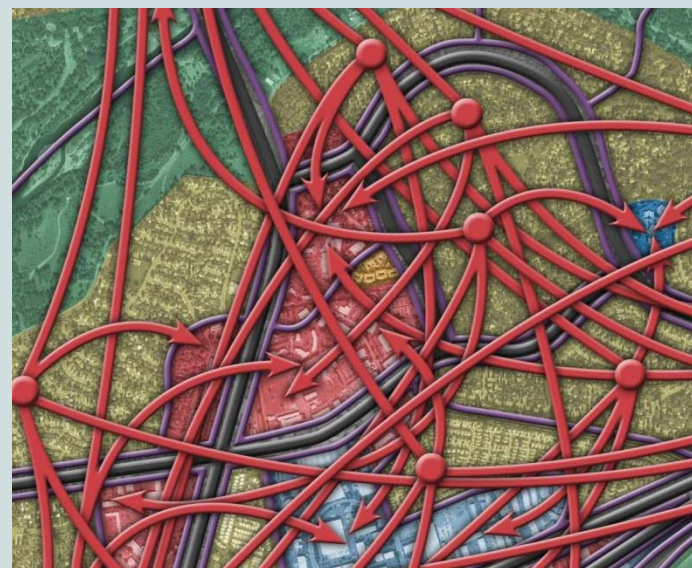
- Forecasts trips onto transportation facilities, roadways, highways, etc.
- Tool used by most public agencies
- Part of the planning process
- CEQA Support
- Fair Share for Impact Fees (AB 1600)
- TDM does NOT calculate LOS

“Four Step” Model

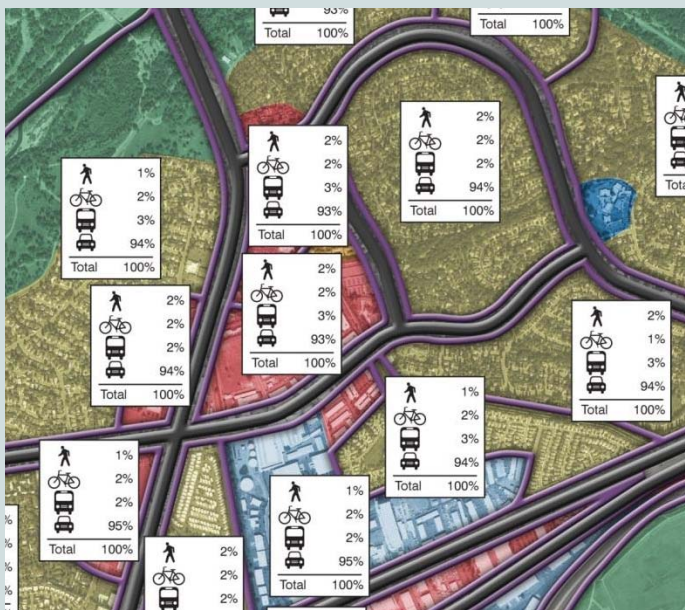




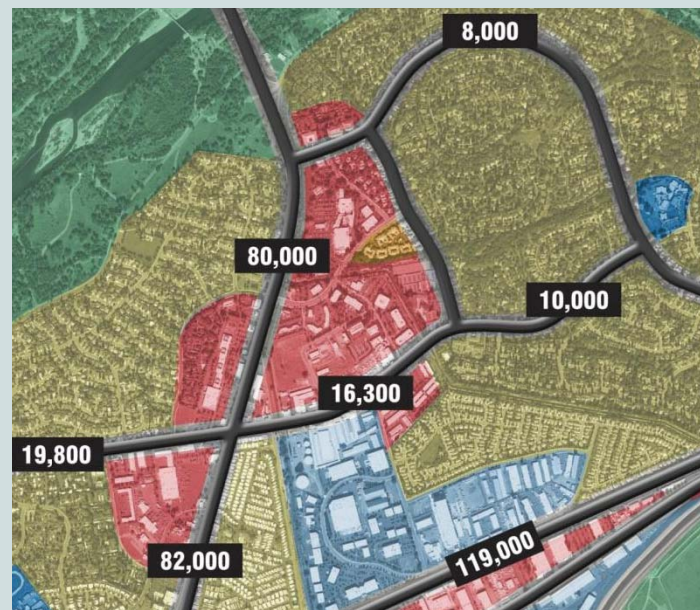
Trip Generation



Trip Distribution

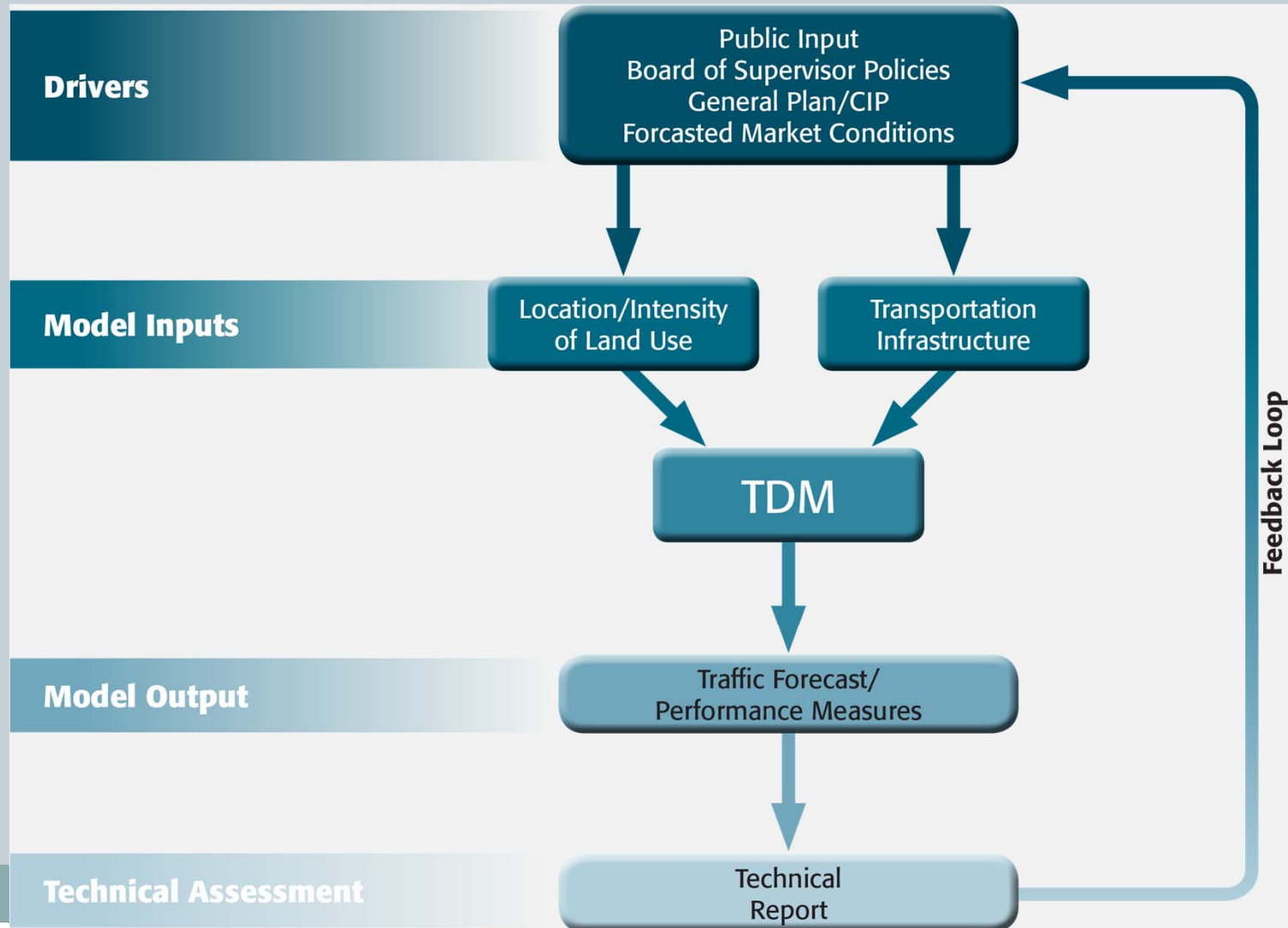


Mode Split

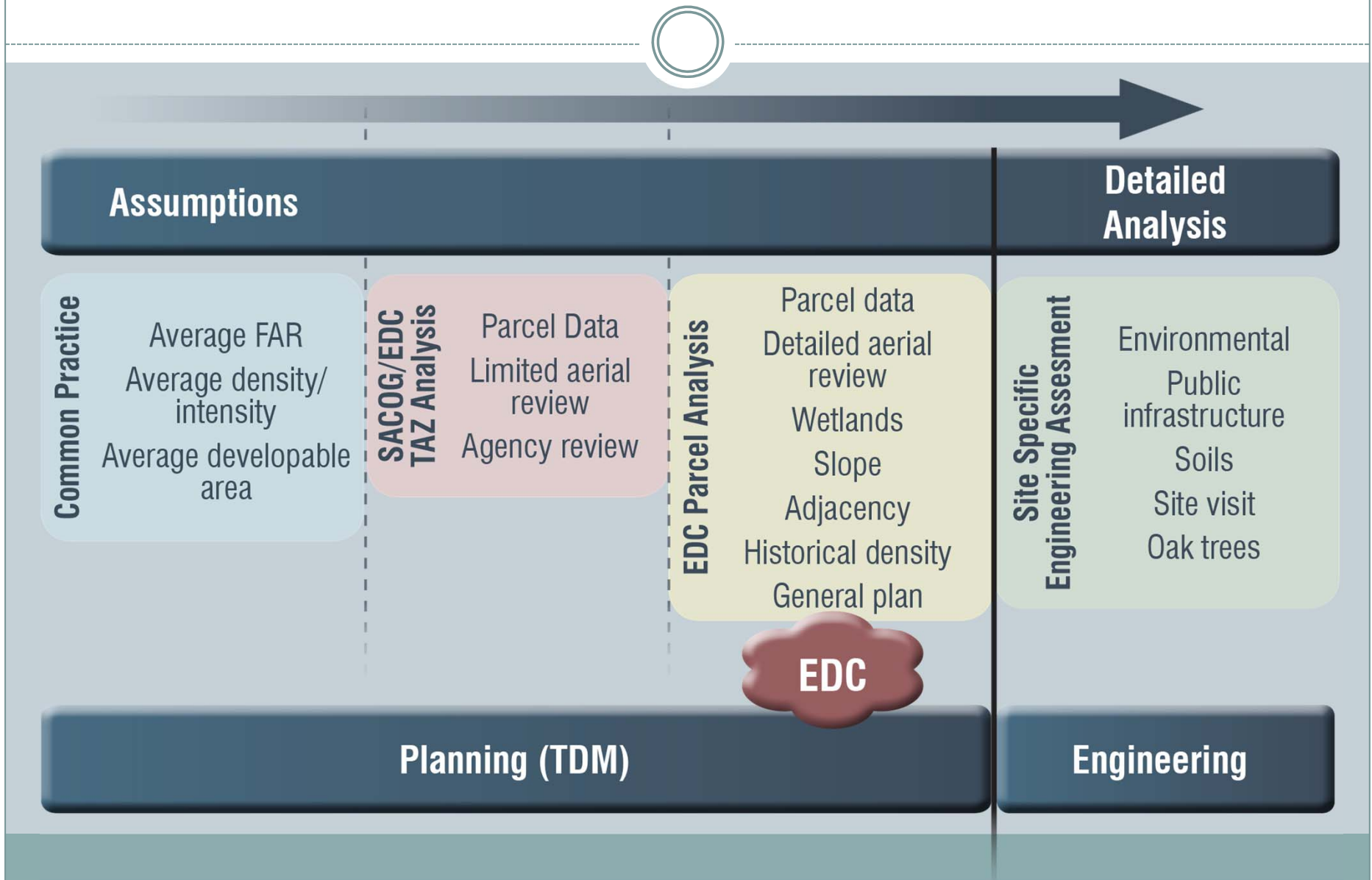


Trip Assignment

TDM and Planning Process



TDM Land Use



Search Google Parcel Search (APN)

Search

ex: pizza near NYC

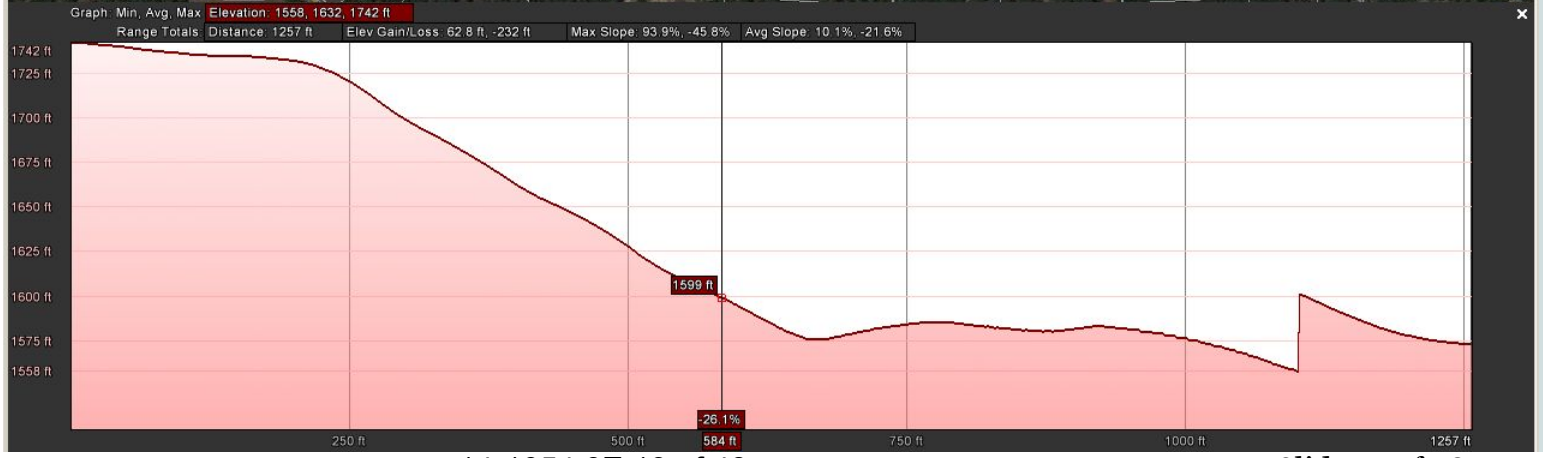
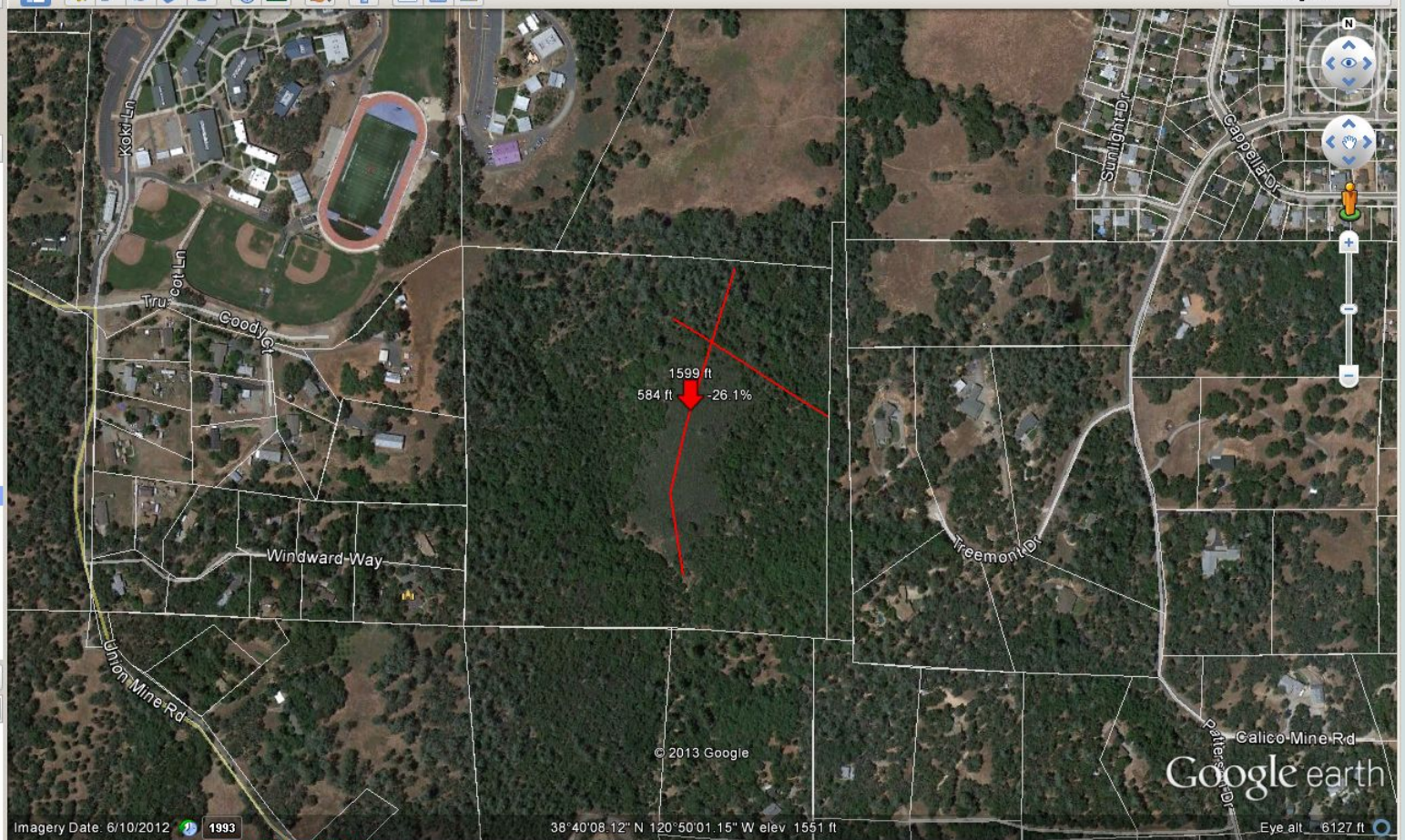
Get Directions History

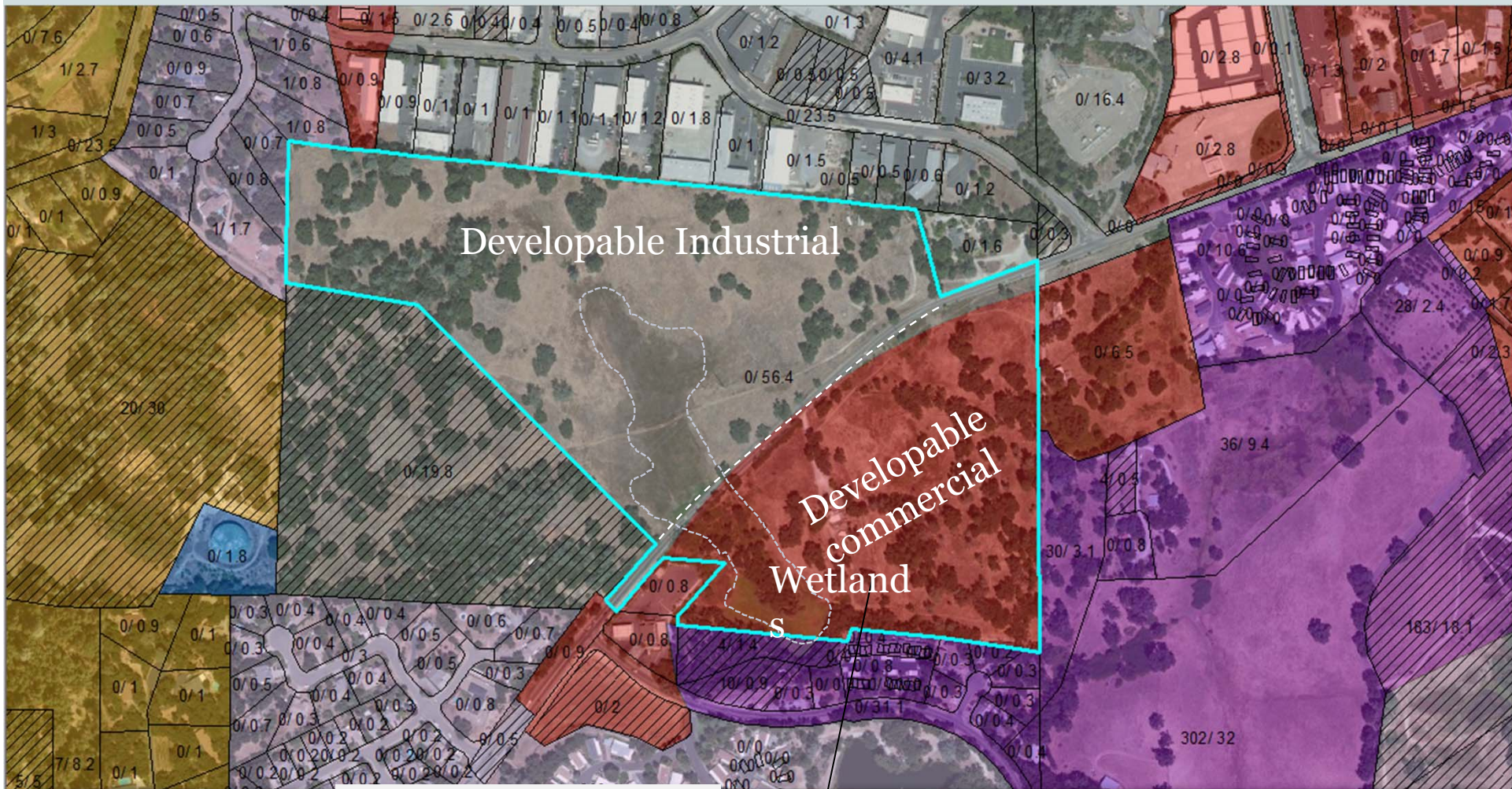
Places

- My Places
- Sightseeing
 - Select this folder and click on the 'Play' button below, to start the tour.
- Line Measure
- Line Measure
- Polygon Measure
- Path Measure
- Path Measure
- Path Measure
- Path Measure
- Path Measure
- Polygon Measure
- Placerville, CA 95667, USA
- Path Measure
- El Dorado Hills, CA, USA
- Temporary Places
- Profile A
- Profile B

Layers Earth Gallery

- Primary Database
- Earth Pro (US)
- Borders and Labels
- Places
- Photos
- Roads
- 3D Buildings
- Ocean
- Weather
- Gallery
- Global Awareness
- More
- Terrain





Industrial land use

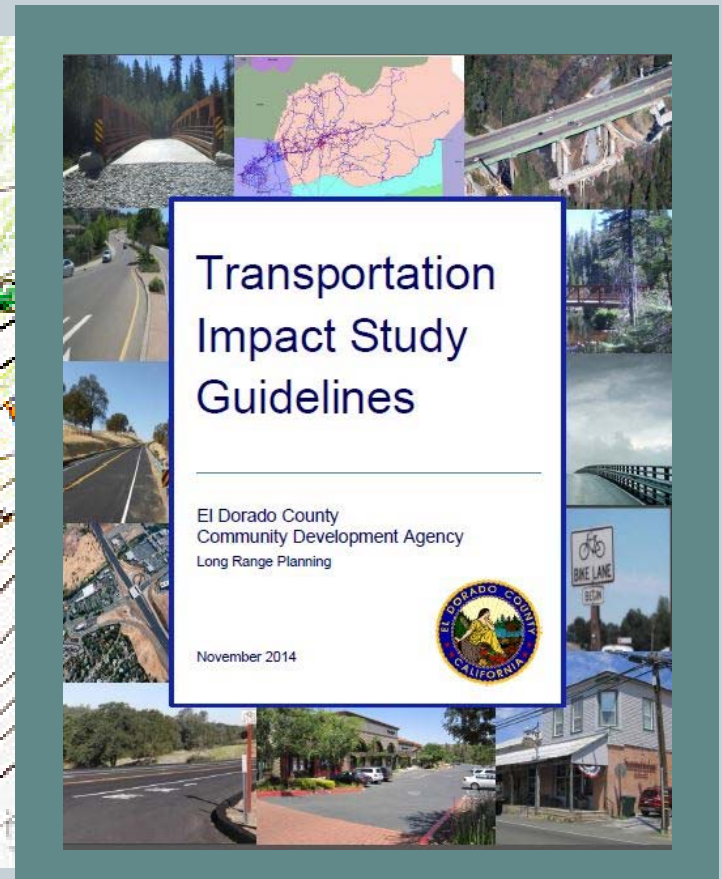
Commercial land use

FLAG	USECDT	USECDCL	LIVING	PARCEL_A	U1_LUD	U1_DU	U1_COVER	CTA_NOTES	SLOPE	WET/ND	Density	PD_POLI	AG_PO	GP_POLICY	HIST_DENST	U2_DU	U2_LU	U2_COVER	C_S
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Flagged for correction

Only 57% developable (43% to ROW and wetlands)

Site Specific Analysis



KHA Public and Agency Involvement



- BOS Presentations previous to project
- BOS Land Use – 4/16/12
- Engineering Subcommittee – 6/27/12
- Public Meeting – 6/28/12
- BOS TAZ – 7/24/12
- Training Workshop – 1/28/13
- EDC Staff Workshop – 2/21/13
- BOS Overview – 4/1/13
- Agency Meeting – 6/13/13
- BOS TDM Workshop – 2/14/14

What is Validation?



- Techniques for determining the model is reasonably accurate
- Simply
 - TDM forecasts 2010 volumes
 - Obtain actual 2010 traffic counts
 - Compare the two using statistical methods
- If valid in 2010, assumed to be valid for future

Validation Criteria Sources



U.S. Department of Transportation
**Federal Highway
Administration**



NCHRP

**NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM**

Model Validation Criteria



Validation Criteria	Question	Pass or Fail?
Correlation coefficient	Is the model a good predictor in total?	<PASS>
Percent Error	Do we have the right amount of total traffic on roadways?	<PASS>
Percent root mean square error (RMSE)	Are total model errors within a reasonable range?	<PASS>
Screenline Analysis	Are the traffic flows between areas reasonable?	<PASS>
Roadway Link Validation	Are individual roadway volumes reasonable?	<PASS>
Peak Period Validation	Considers just the highest 4 hour periods.	<PASS>
Peak Hour Validation	Considers just the highest 1 hour periods.	<PASS>
Dynamic Validation	Is the model sensitive to change?	<PASS>

Model Peer Review and Acceptance



Kittelson Peer Review

- Land Use Summary Check;
- External traffic growth assumption check;
- Trip Purpose and Trip Generation check (productions and attractions);
- Verify person trip vs. vehicle trip Origin-Destination (OD) matrix;
- 5-D Application assessment;
- Zone connector checks;
- Check/verify network coding conventions – check against County’s CIP list;
- Check logical link volume growth;
- Volume comparisons for key facilities relative to past forecasts; and,
- Check and verify static validation statistics (if available and documented);

Caltrans & SACOG Endorsement



STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY

EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION

DISTRICT 3
703 B STREET
MARYSVILLE, CA 95901
PHONE (530) 741-4337
FAX (530) 741-4245
TTY 711
www.dot.ca.gov/dist3



Serious drought.
Help save water!

September 22, 2014

Steve Pedretti, Director
El Dorado County Community Development Agency
2850 Fairlane Court
Placerville, CA 95667

Dear Mr. Pedretti:

Thank you for addressing our concerns regarding the El Dorado County Travel Demand Model (EDCTDM). With the recent modifications, the EDCTDM conforms to the state-of-practice in travel demand modeling; meets overall traffic assignment validation standards suggested by FHWA and Caltrans; and is an appropriate tool for the County's long range planning purposes.

While the EDCTDM as a whole is acceptable and meets industry standards, please keep in mind when used for future specific projects, a subarea validation will be necessary for approval of traffic impact studies. Additionally, some areas of the model may exceed validation standards and/or generate unexpected outputs, which will require further model improvements and post processing to achieve acceptable results.

If you have any questions, please contact Nicholas Deal, Chief, Office of Travel Forecasting and Modeling at (530) 741-5151 or via email at nicholas.deal@dot.ca.gov.

Sincerely,

MARLON A. FLOURNOY
Deputy District Director
Planning & Local Assistance

- c: Dave Defanti, Assistant Director of Community Development Agency
- Claudia Wade, CDA Long Range Planning Division
- Natalie Porter, CDA Long Range Planning Division
- Amarjeet S. Benipal, District 3 Director, Caltrans
- Sharon Scherzinger, EDCTC
- Mike McKeever, SACOG

"Provide a safe, sustainable, integrated and efficient transportation system
to enhance California's economy and livability"

Sacramento Area
Council of
Governments

1415 L Street,
Suite 300
Sacramento, CA
95814

916.321.9000
916.321.9551
916.321.8550
www.sacog.org



February 3, 2014

Kimberly A. Kerr
Acting Community Development Agency Director
Community Development Agency
2850 Fairlane Court
Placerville, CA 95667

Dear Ms. Kerr:

This is in response to your letter of November 7, 2013 regarding the El Dorado County Travel Demand Model. We appreciated the collegial spirit in which your agency engaged with SACOG over the course of the EDCTDM development. SACOG's involvement over the course of the development has been: providing parcel-level base year and future year land use data; providing documentation, data files, and programs from SACOG's pre-2007 travel demand model, SACMET07; and periodic staff check-ins opportunities to review and comment on the project.

We understand that all of the base year data and other files provided by SACOG have been thoroughly reviewed and revised by your agency staff and your consultant for the project. The land use data was for all intents and purposes rebuilt entirely over the course of the project, and the future year land use data will be based on "achievable development" at "reasonably expected intensity" based on the County General Plan land use categories. Significant detail was added to the base year highway network and zone system, to allow for trip generation, distribution and assignment to be assessed for very small land areas. Also, the SACMET07 programs were revised to include a "SD's" post-processing adjustment, among other things.

We understand that the EDCTDM is intended primarily for County staff to analyze and forecast traffic for the County long-range transportation plan, the transportation improvement program, and other local studies. We appreciate that your agency understands that other travel demand models, such as SACOG's SACSIM regional travel demand model, are needed for planning studies and analyses which cover a larger area than the EDCTDM does, and that those models will be used for those studies and analyses instead of the EDCTDM. Good examples of such plans and studies are the Metropolitan Transportation Plan/Sustainable Community Strategy, and the emissions and air quality analysis which goes along with that. For all base year land use and network data for El Dorado County in SACOG models, we will continue to share and coordinate with your staff to ensure that the representation of the county in both models is consistent.

Altam
Colusa Heights
Colusa
Davis
El Dorado County
El Grove
Folsom
Gold
Grass Valley
Lincoln
Live Oak
Loomis
Marysville
Placer County
Placerville
Rancho Cordova
Rocklin
Roseville
Sacramento County
Sutter County
West Sacramento
Woodland
Yuba County
Yuba City
Yuba County

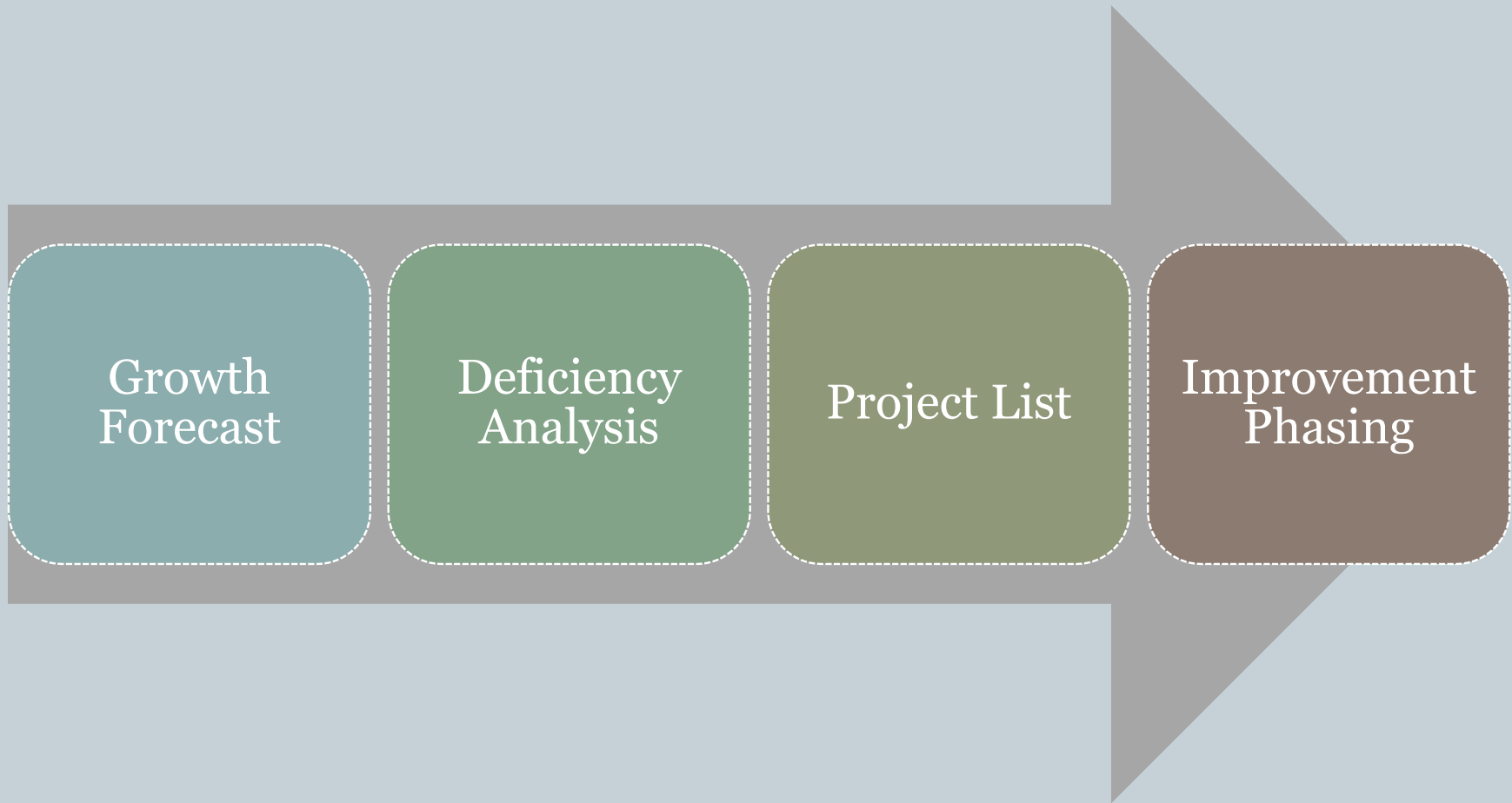
February 3, 2014
Ms. Kimberly A. Kerr
Page 2

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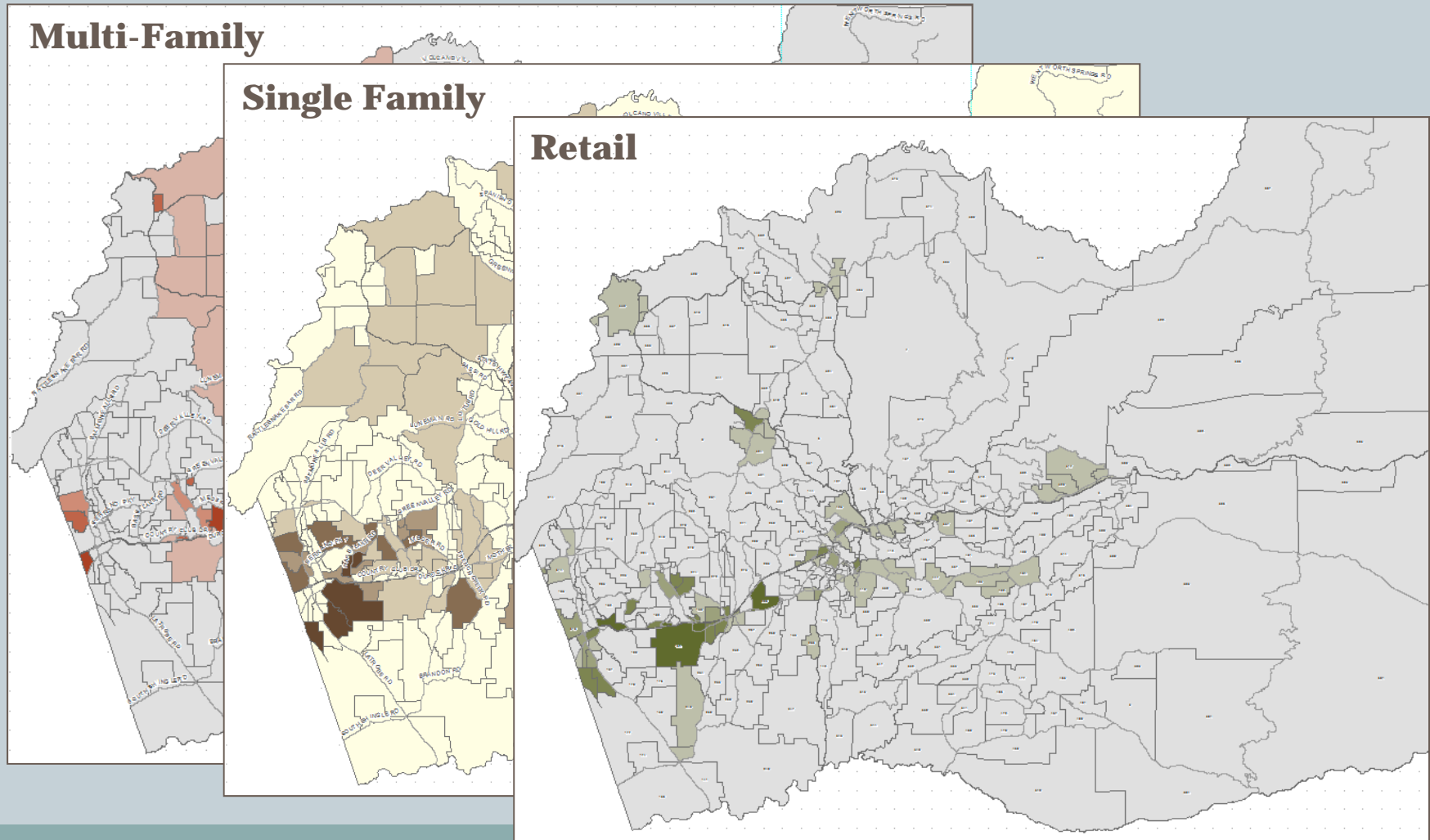
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TIM Fee Improvement Needs



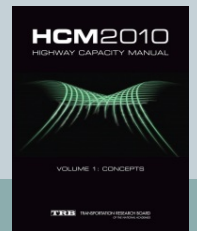
2015 – 2035 Growth Forecast



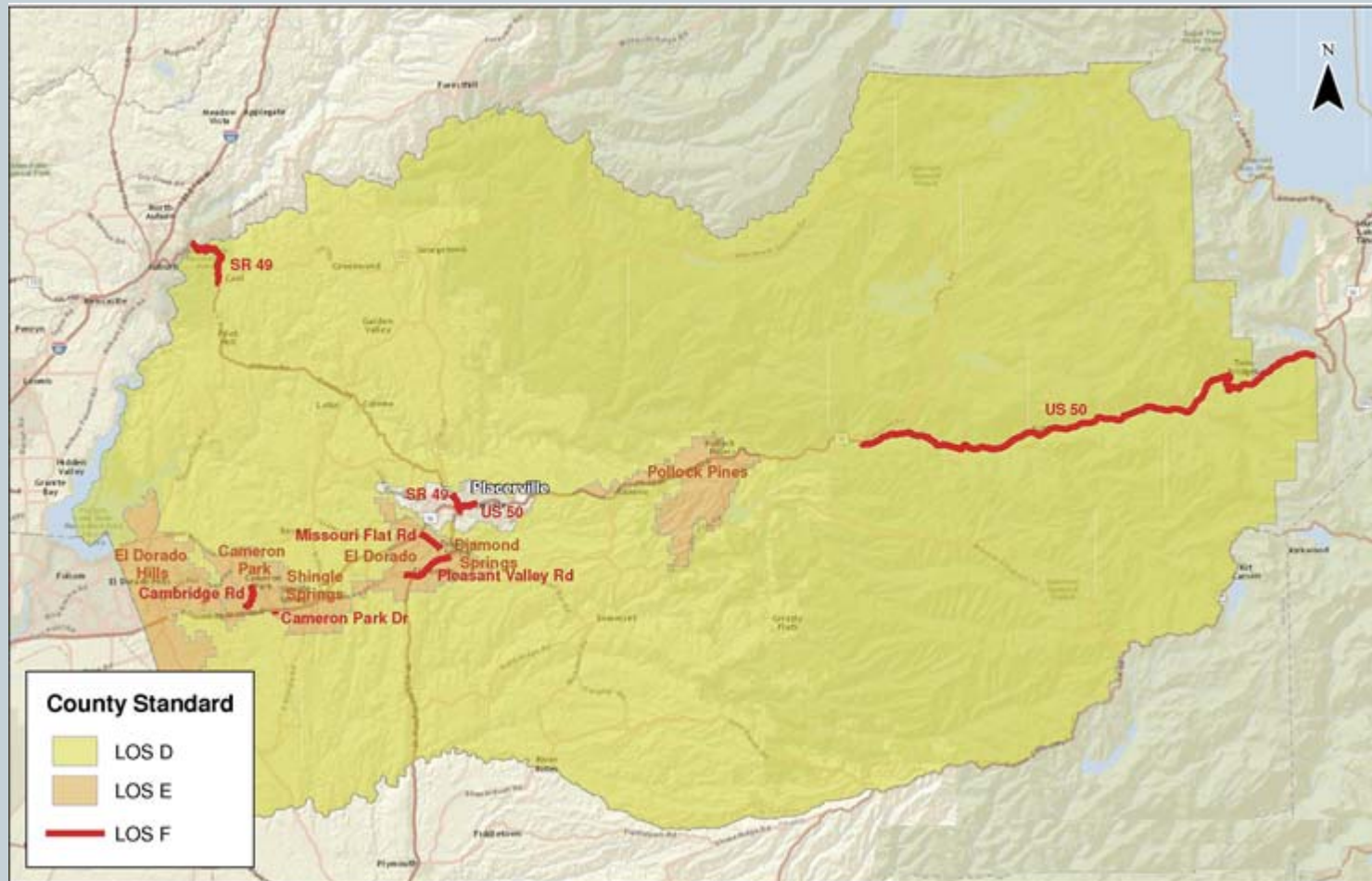
Level of Service (LOS) Thresholds



- LOS thresholds in General Plan Policy TC-Xd
- LOS determination based on 2010 Highway Capacity Manual (HCM)
 - Specific thresholds and LOS methods for each type of road – freeways, rural roads, arterials and collectors
- Highway Capacity Manual
 - Standard reference in all 50 states and other countries
 - Published by the Transportation Research Board (TRB) – part of the National Academy of Sciences
 - ✦ Mission: To provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multi-modal.
 - First published in 1950, the 2010 HCM is the fifth edition
 - Dr. Richard Dowling, of Kittelson & Associates, was the TRB Committee Chair overseeing the research and publication of the HCM



Compare Forecasts to LOS Standards



TIM Fee Project List



Capacity Projects

- Local roadway widening
- Auxiliary lanes
- Interchange improvements
- Parallel capacity projects (e.g., Saratoga Way)

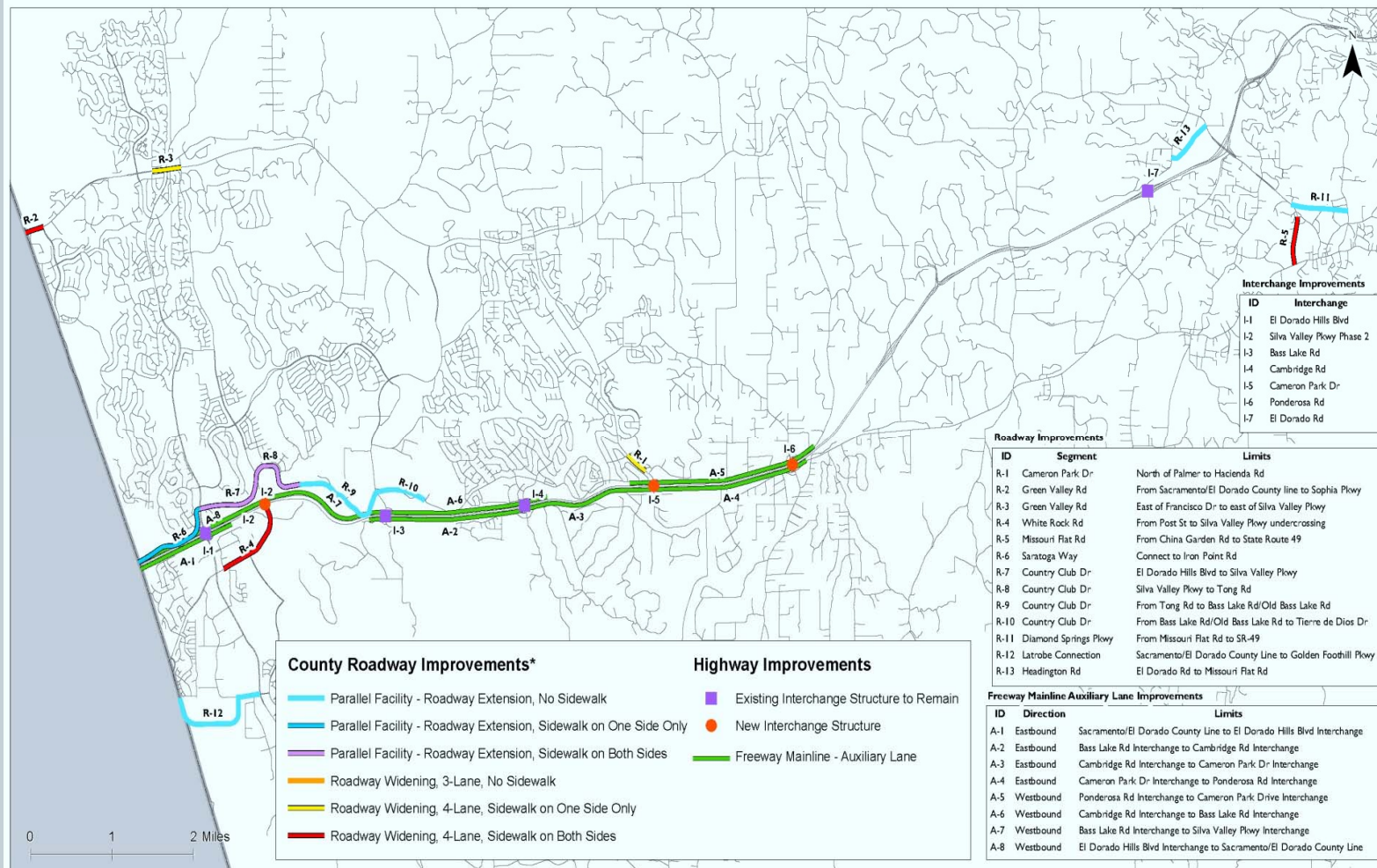
Reimbursement Obligations

- Constructed projects (e.g., Silva Valley Parkway Interchange)

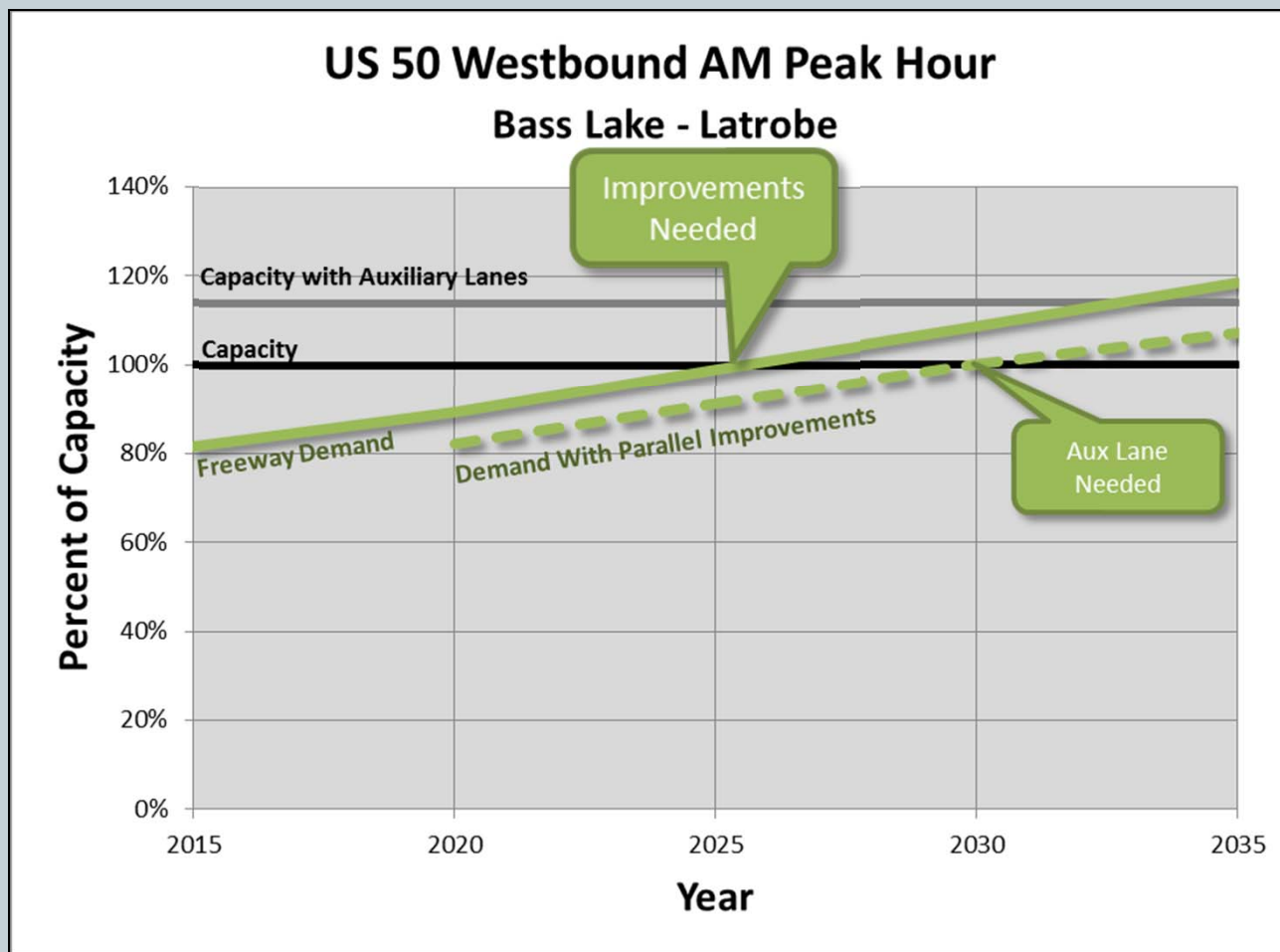
Other Program Costs

- Bridge replacement grant match funds
- Intersection improvements
- Transit capital improvements
- Program administration

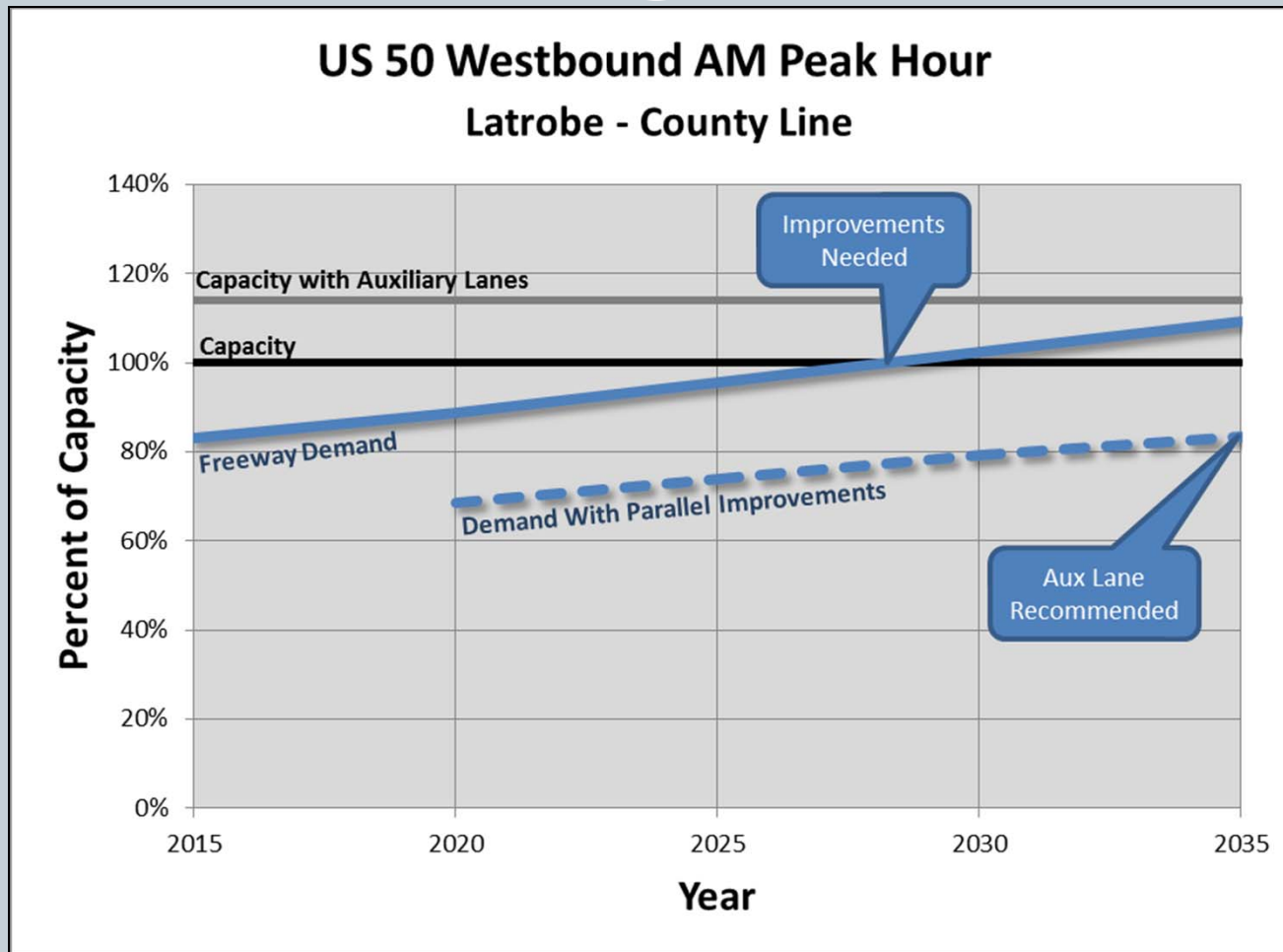
TIM Fee Project Locations



Phasing of Improvements



Phasing of Improvements



Highway 50 Level of Service



- John Long, P.E., T.E., Principal - DKS
- Andrew Brandt, P.E., Deputy District Director for Maintenance and Traffic Operations – Caltrans



Caltrans Traffic Data



- For decades, Caltrans has relied on traffic census program:
 - Typically each location counted every 3 years with sample counts throughout year to estimate volumes
 - “Peak hour” represents estimate of heaviest traffic flow
 - For urban and suburban areas, the peak hour normally occurs on weekdays between 7 to 9 AM or 5 to 7 PM.
 - On roads with large seasonal fluctuations in traffic, the peak hour is the hour near the maximum for the year but excluding a few (30 to 50 hours)
- Over the last 10 years, Caltrans has worked hard at implementing a large number of permanent count stations that can provide year-round traffic volume and speed data
- Caltrans has a permanent count station at the County Line

Existing Traffic Data – US 50 at County Line



- County line permanent count station provides traffic count and speed data by travel direction by 5 minute periods for 24-7 and 365 days
- Based on County policy, counts should reflect “typical weekday” conditions
- Best practice for a typical weekday is:
 - Tuesday, Wednesday, Thursday
 - With schools in session and away from holidays
 - March, April May, September and October
- Data from County Line was compiled for those days in 2010 and 2015

Caltrans PeMS Volume & Speed Data

US 50 - Westbound AM Peak Hour

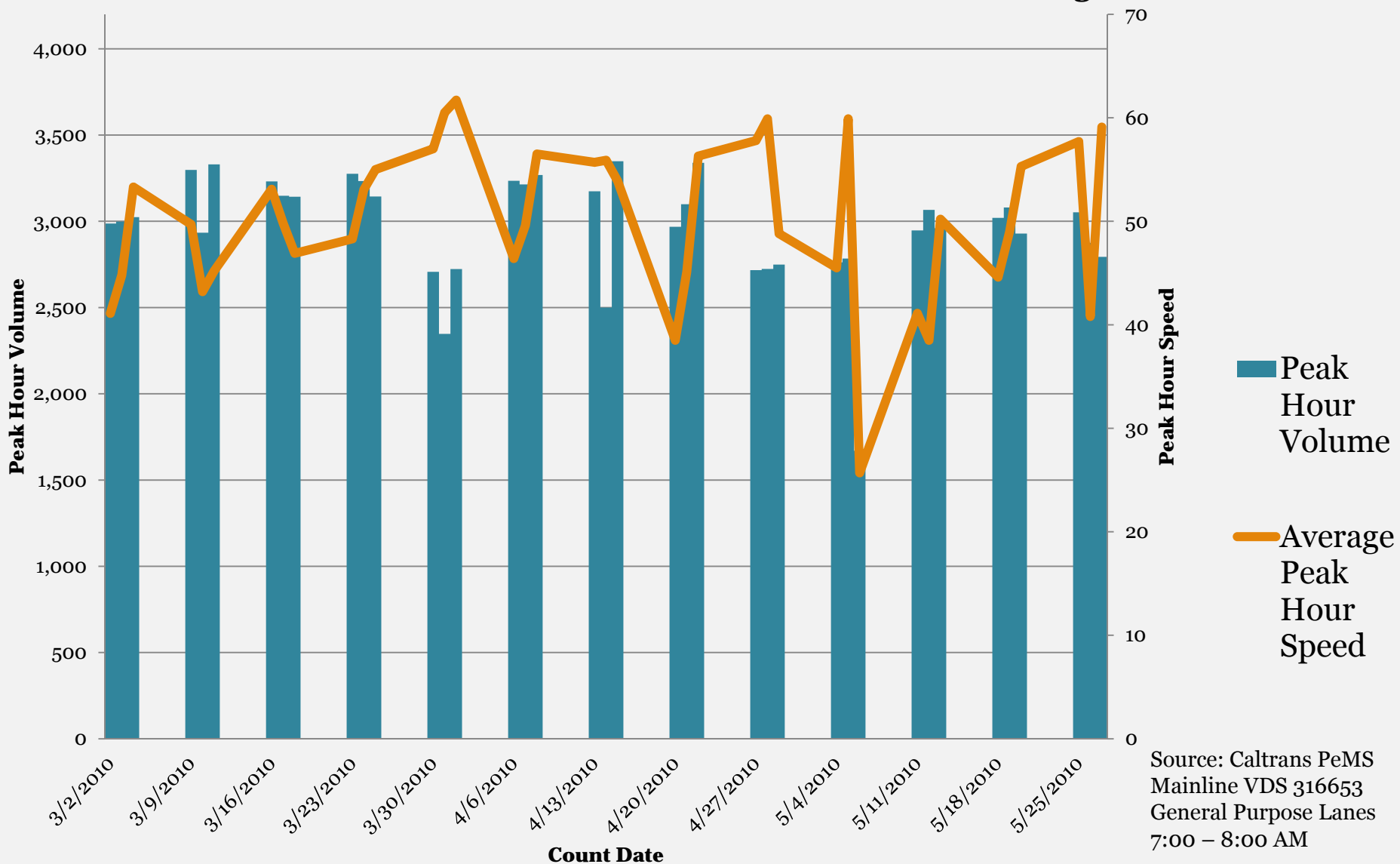
At the County Line

Spring 2010

Average Volume – 3,038 vph¹

Average Speed - 50 mph¹

Average LOS - LOS C



Source: Caltrans PeMS
Mainline VDS 316653
General Purpose Lanes
7:00 – 8:00 AM

¹Averages do not include outliers.

Caltrans PeMS Volume & Speed Data

US 50 - Westbound AM Peak Hour

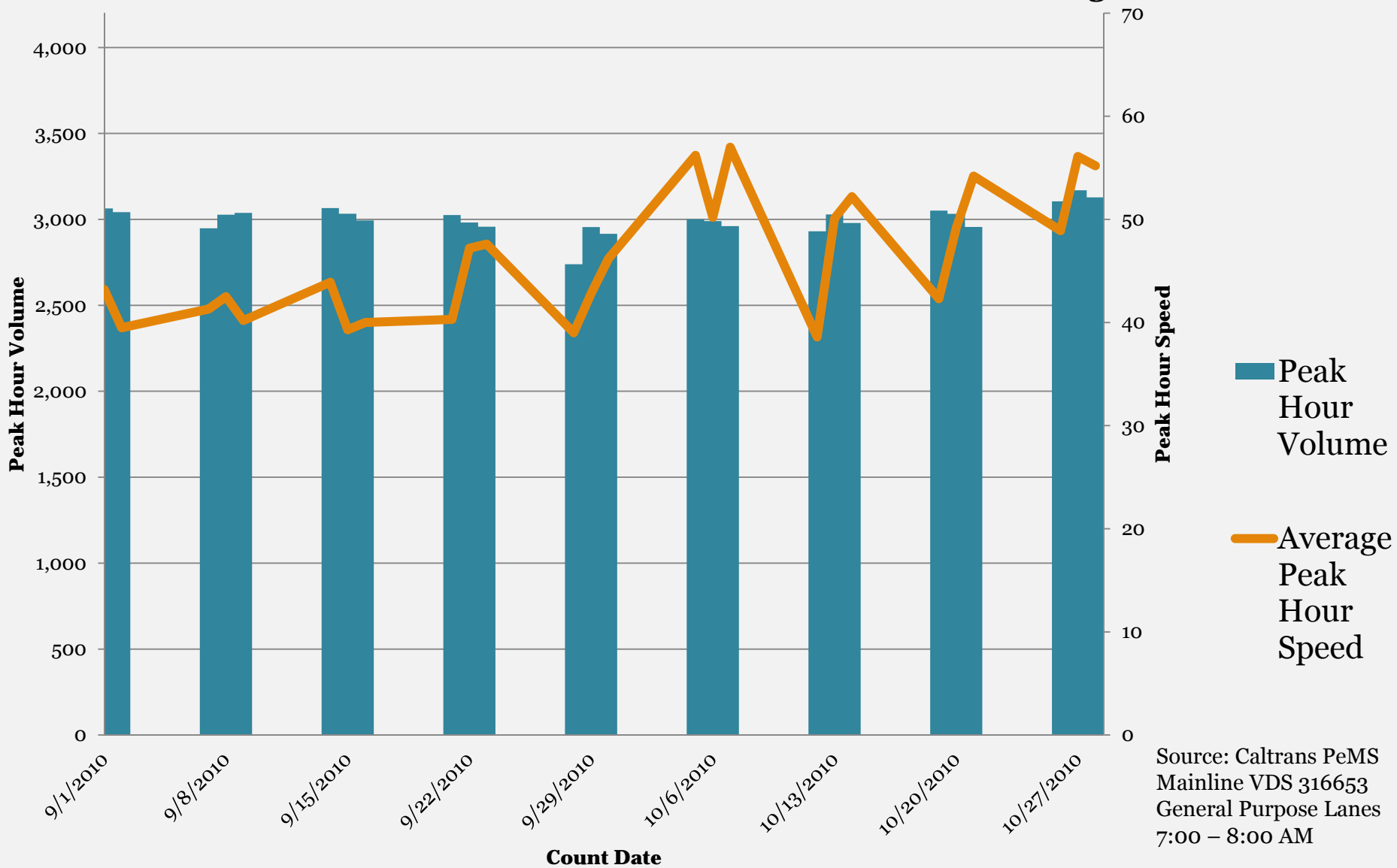
At the County Line

Fall 2010

Average Volume - 3,004 vph

Average Speed - 46 mph

Average LOS - LOS C



Caltrans PeMS Volume & Speed Data

US 50 - Westbound AM Peak Hour

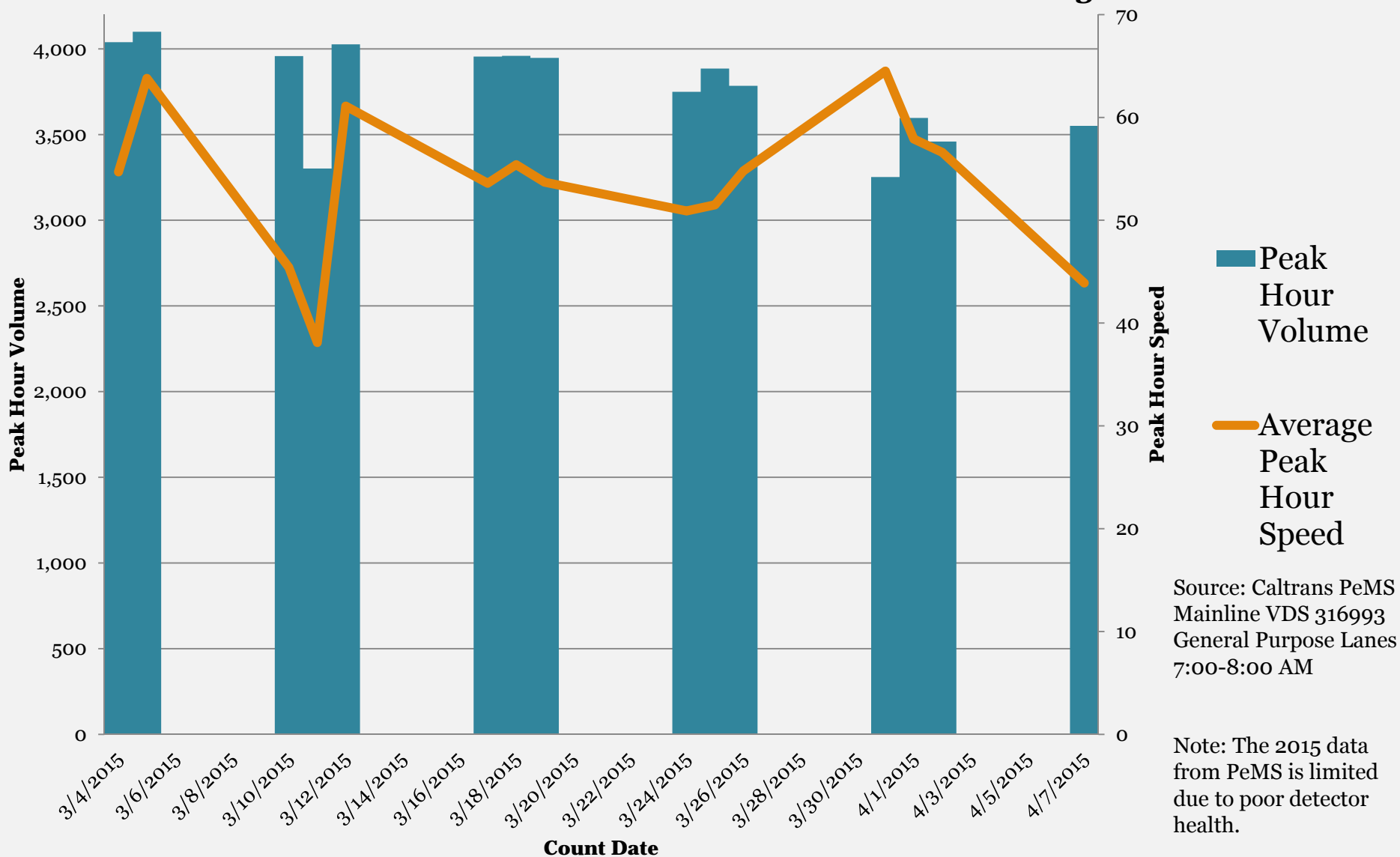
At the County Line

Spring 2015

Average Volume - 3,930 vph¹

Average Speed - 55 mph¹

Average LOS - LOS E



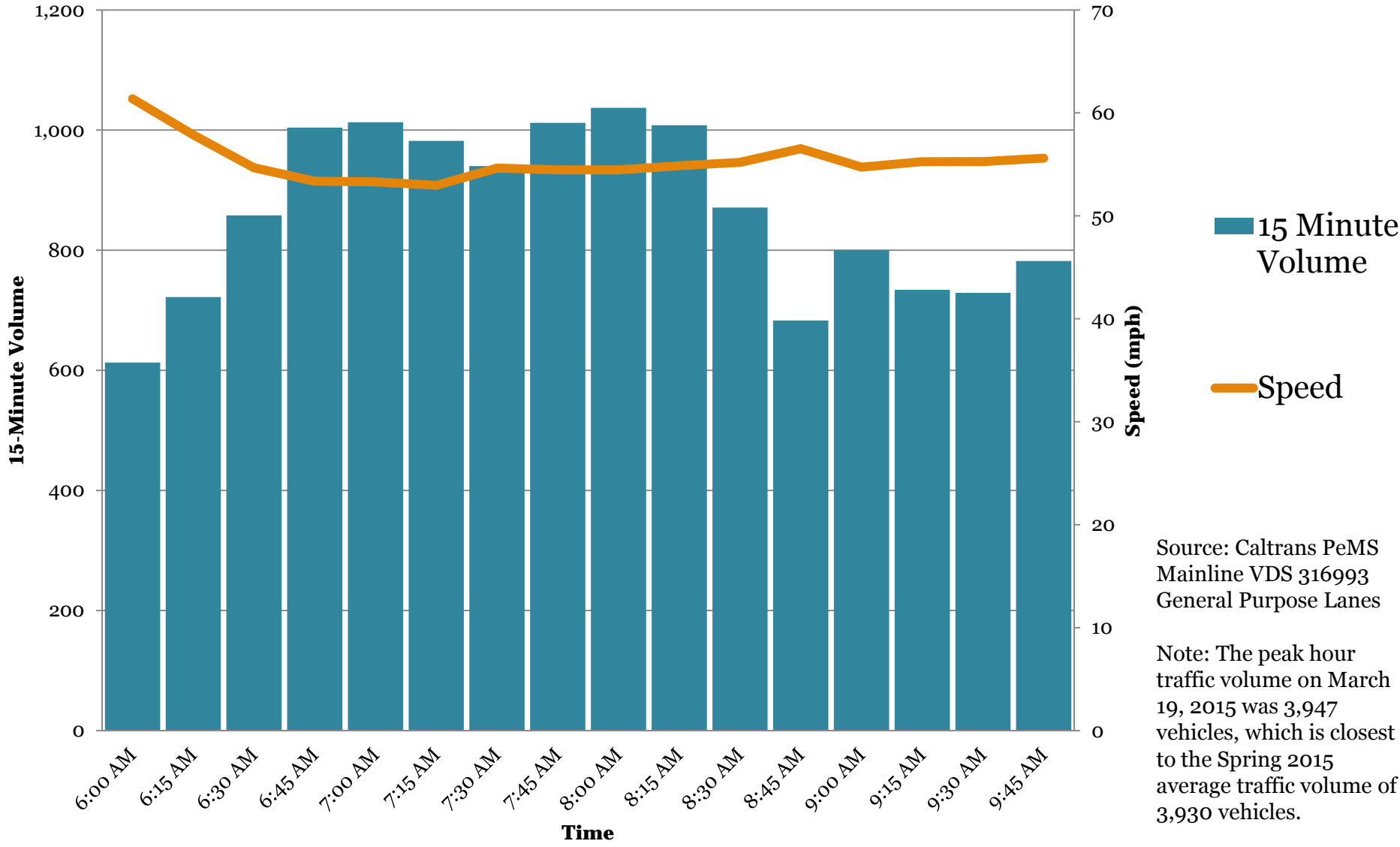
¹Averages do not include outliers.

Caltrans PeMS Volume & Speed Data

US 50 - Westbound AM Peak Hour

At the County Line

Average Day - March 19, 2015



Source: Caltrans PeMS
Mainline VDS 316993
General Purpose Lanes

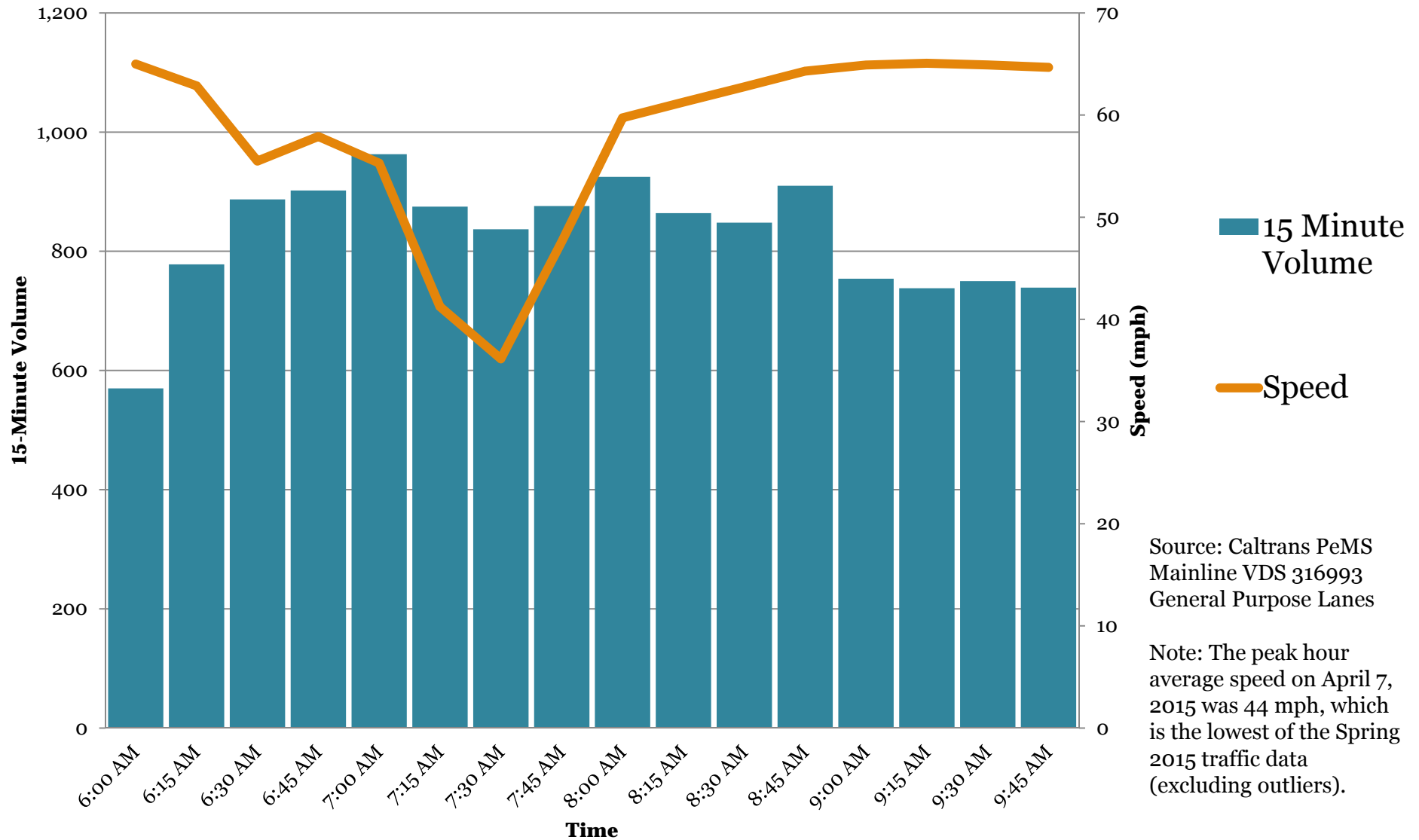
Note: The peak hour traffic volume on March 19, 2015 was 3,947 vehicles, which is closest to the Spring 2015 average traffic volume of 3,930 vehicles.

Caltrans PeMS Volume & Speed Data

US 50 - Westbound AM Peak Hour

At the County Line

Lowest Peak Hour Speed- April 7, 2015



Source: Caltrans PeMS
Mainline VDS 316993
General Purpose Lanes

Note: The peak hour average speed on April 7, 2015 was 44 mph, which is the lowest of the Spring 2015 traffic data (excluding outliers).

Existing Traffic Data – US 50 at County Line



- Data from County Line count station for typical weekdays indicate typical fluctuation of volumes and speeds

AM Peak Hour Westbound Traffic Data

Year	Avg Volume	Avg Speed	Avg LOS
2010	3,000 vph	46-50	C
2015	3,900 vph	55 mph	E

- Data from County Line count station is consistent with calculated levels of service using Highway Capacity Manual (HCM) and observed conditions

Caltrans Volumes from 2014 TCR/CSMP



- Caltrans reports a volume of 4,590 for peak hour at the County line
- Peak hour volume of 4,590 is higher than PeMS count data from County line station - for multiple “typical weekdays”
- Volume is thus not appropriate for use in the TIM Fee Nexus Study

Caltrans PeMS Data



- PeMS Data Usage
- Raw Data on Website
- Detector health

Caltrans Participation



- Peer Review of TDM resulting in its acceptance
- Review of assumptions for existing and future LOS
- Provided volume data used for Highway 50 for existing conditions used for the Major CIP and TIM Fee Update

July 5, 2016 Caltrans letter to El Dorado County related to the Major CIP and TIM Fee Update states:

“We agree with the traffic analysis methodology, traffic analysis assumptions, and associated analysis results for US 50 for the existing and future scenarios.”

**Important to note that Caltrans is involved with project-level studies from the County, including all relevant development projects and County CIP projects. The County and Caltrans will continue to coordinate.

Why doesn't public perception match the technical calculations?

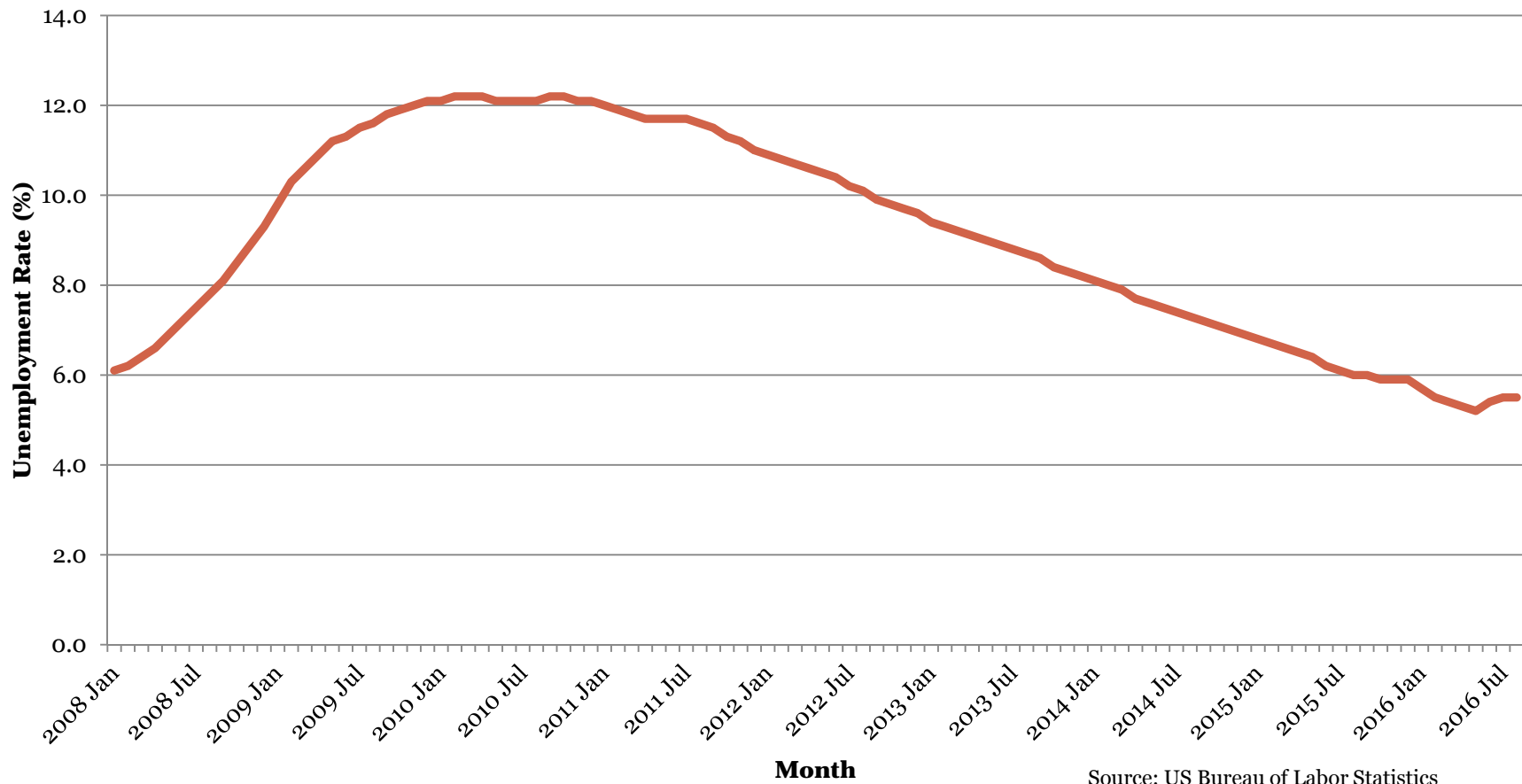


- People tend to remember the worst days
- Fluctuations in traffic volumes & speed
 - Incidents, work zones, weather, school schedules, special events, seasonal attractions, heavy vehicles, platooning, etc.
- Level of Service is calculated for the entire hour, not for a single point in time
- American Society of Civil Engineers (ASCE) research shows that certain LOS grades are difficult for the general public to identify and
- Perception varies from person to person

Why have traffic levels increased?



El Dorado County Unemployment Rate

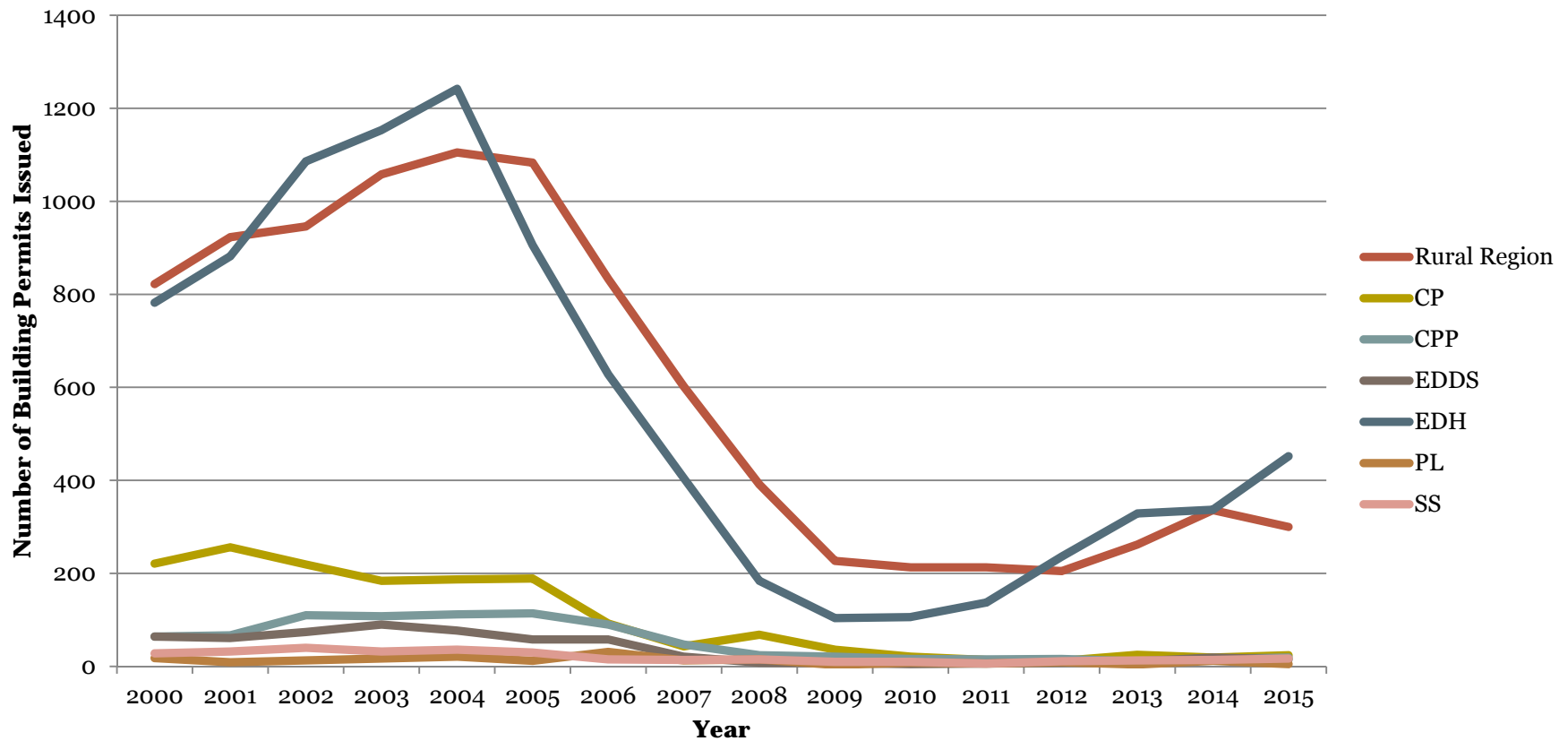


Source: US Bureau of Labor Statistics

Why have traffic levels increased?



Residential Building Permits Issued per Year By Community Region



What is the County doing to prevent LOS F at the County Line?



Recent Projects

- 2010 – HOV Lanes
- 2011 – El Dorado Hills Blvd Interchange Improvements
- 2016 – Silva Valley Pkwy Interchange
- 2016 – Carson Crossing Drive

Future Projects

- Adjust ramp metering rate (Caltrans)
- Saratoga Way Extension
- White Rock Road Widening
- Auxiliary lanes on US 50
- Green Valley Road Widening (City of Folsom)

What is the County doing to prevent LOS F and improve roads throughout the County?



Traffic Operations

- Annual Traffic Count Program
- Intersection Needs Prioritization Process
- Regular TDM Updates
- Annual and Major Updates to CIP and TIM Fee Program
- CIP Projects
 - 24 projects in Construction
 - 31 projects in Planning, Design, or ROW Phases

Other Monitoring Programs

- Pavement Management Program
- Annual Accident Location Survey
- Traffic Advisory Committee
- Maintenance Requests

Next Steps



Board of Supervisors presentation on Friday, October 28, 2016 at 1 p.m.

Any additional questions/comments on this workshop can be submitted by Friday, October 14, 2016:

- E-mail: claudia.wade@edcgov.us
- In person at: 2850 Fairlane Court, Building C, Placerville
- Fax: (530) 642-0508

ANY QUESTIONS?

