

*Using the Caltrans Performance
Measurement System (PeMS) for
TCR's*

Jane Berner and Tim Hart

Caltrans HQ, Division of Traffic Operations

jane_berner@dot.ca.gov, (916) 654-2843

timothy_hart@dot.ca.gov, (916) 651-5324

February 25, 2013

Outline for Today's Presentation

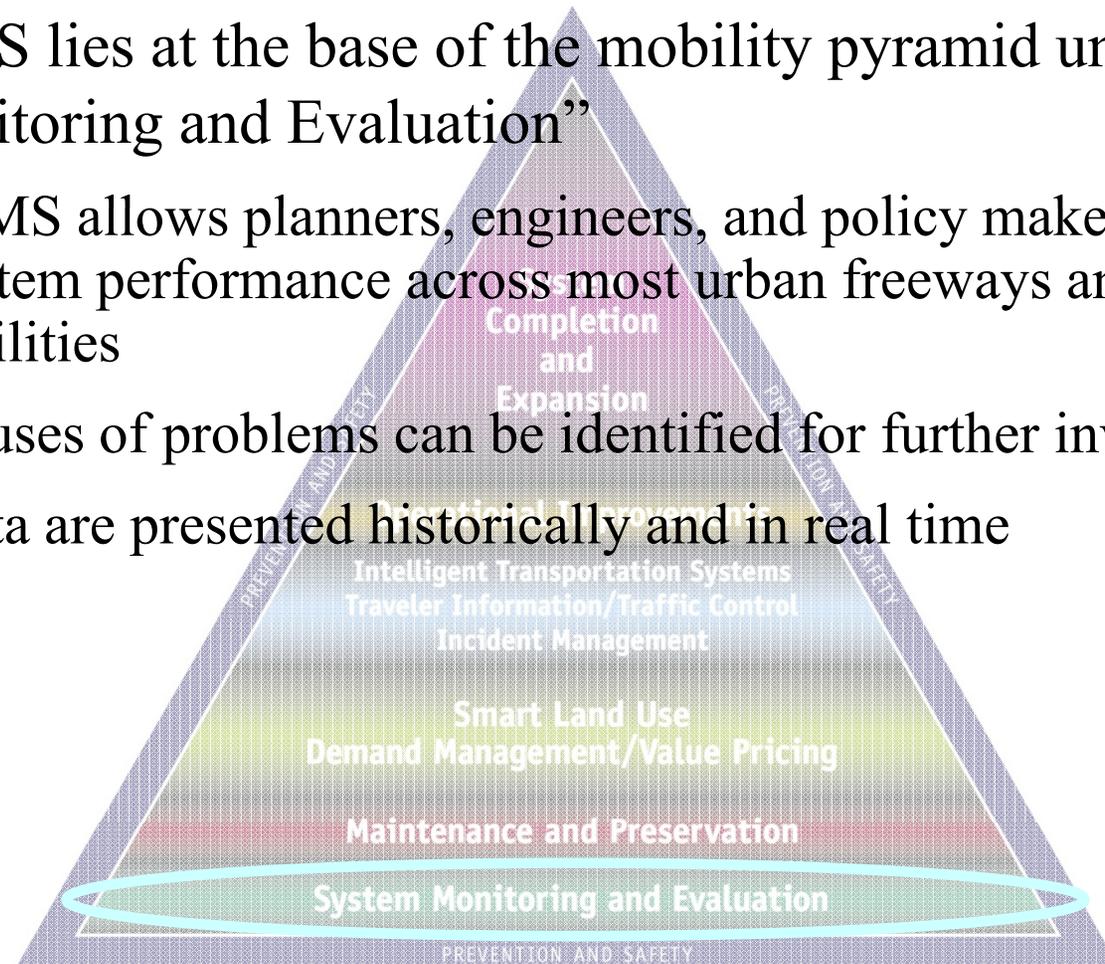
- General overview of PeMS and how it works
- How to log into PeMS
- How to navigate and find data in PeMS
- How to find specific performance measures for TCRs
- Tips for analyzing data and getting help

What is PeMS?

- A website that *anyone* can access: <http://pems.dot.ca.gov>
- A centralized traffic data warehouse
 - Near real-time and historical data
 - Including data collected through automated detection
 - Over 37,000 detectors deployed on urban freeways throughout California
- A data visualization and analysis tool
- A system that enables system monitoring and evaluation

Where does PeMS fit into Caltrans' Mobility Pyramid?

- PeMS lies at the base of the mobility pyramid under “System Monitoring and Evaluation”
 - PeMS allows planners, engineers, and policy makers to track system performance across most urban freeways and other facilities
 - Causes of problems can be identified for further investigation
 - Data are presented historically and in real time

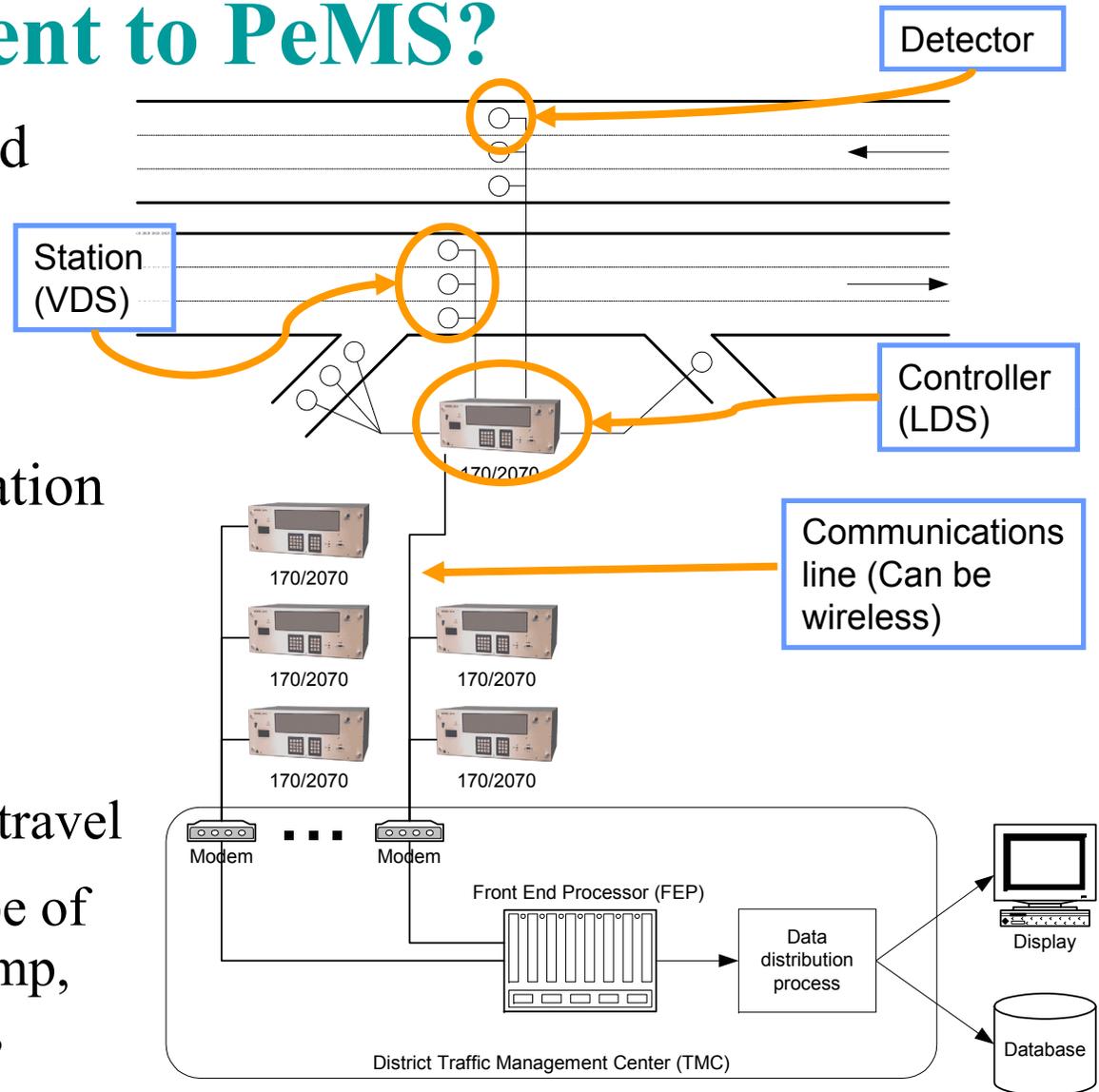


A detector is a device that:

- Measures the number of vehicles (flow or volume) and how long they remain over the detector (occupancy) on a facility for each lane; sometimes it measures speed directly
- Reports data on a cycle to the controller (typically every 30 seconds)
- Forms the basis of PeMS
- Comes in many types of devices
 - Inductive loops, magnetometers, radar

How is data sent to PeMS?

- Detection on the road measures flow, occupancy, and sometimes speed
- Vehicle Detector Station = VDS or “Station”
 - Set of detectors
 - Covering all lanes
 - In one direction of travel
 - Monitoring one type of facility (e.g., on-ramp, off-ramp, mainline, HOV)



Data in PeMS

- More than data from our automated, real-time detectors
- Traffic Census station data
 - Non-real-time volume data and AADTs from all over the state
- Weigh-in-Motion (WIM) and vehicle classification data
 - Approximately 100 locations
- Caltrans Photolog
- Electronic Toll Collection (ETC) tag data
 - Provides travel times in the San Francisco Bay Area
- Incident data
 - Real-time and archived CHP data, and archived accident data from TASAS (for Caltrans users only)
- Lane Closure System
 - Real-time and archived lane closure information

Items in blue are available in all districts

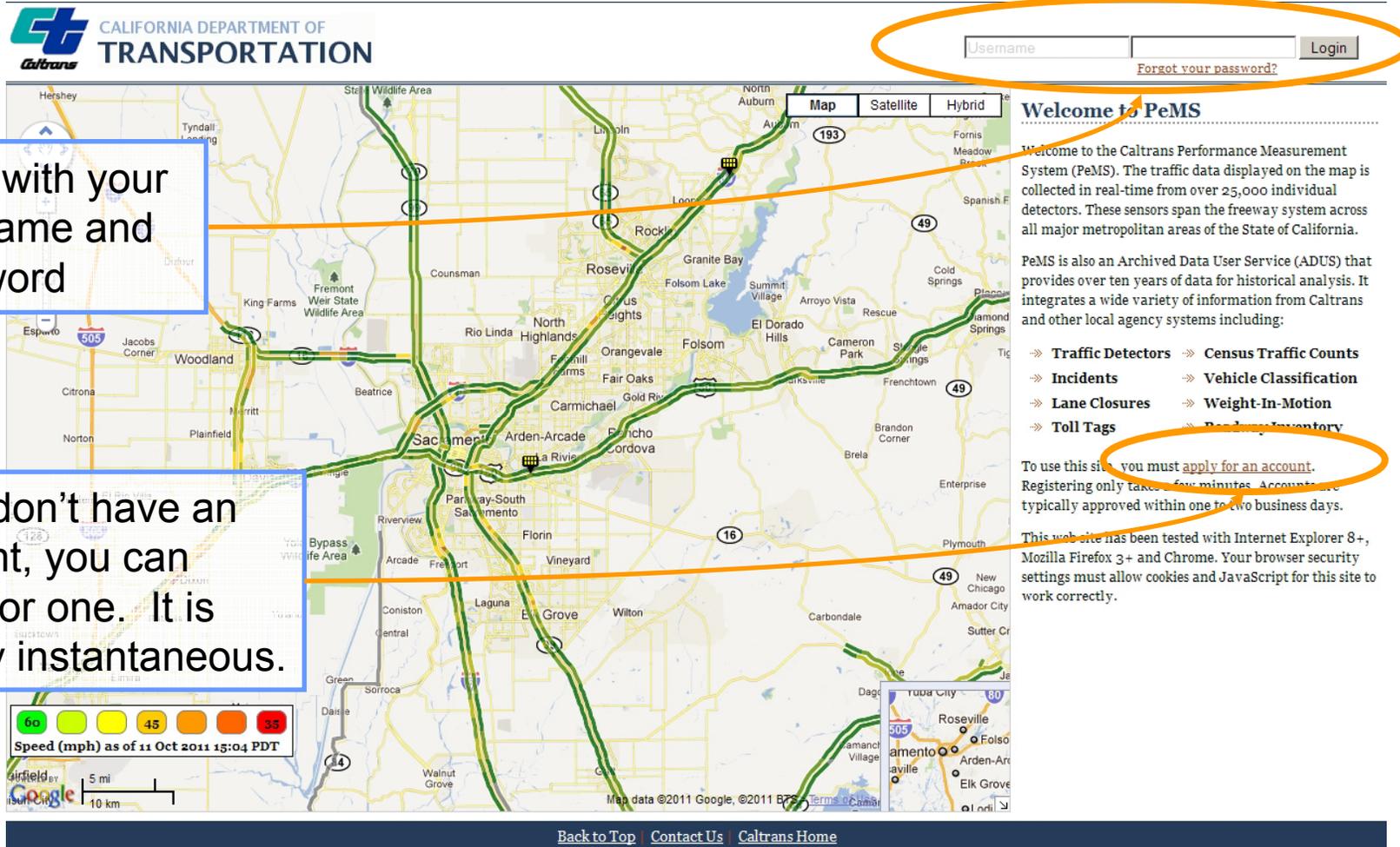
Types of TCR Data in PeMS

- Annual Average Daily Traffic (AADT)
- Vehicle Miles Traveled (VMT)
- Daily Vehicle Hours of Delay (DVHD)
- Bottleneck Locations
- Peak Hour/Peak Period Data
- Managed Lanes (HOV) Data
- Travel Time Reliability
- Level of Service (LOS)

How can data be analyzed in PeMS?

Object in PeMS	Description	How to find?	Example	Example Report
Station	Individual sensor point	Know the ID, search on map, know the location	VDS 317842	Flow versus time
Freeway Segment	Arbitrary section of a freeway	Know the freeway and the postmile range	I-80 from PM 75 to PM 85	Delay versus time of day
Route	Predefined freeway segment	Know the name of the route	“D03 Davis-Sacramento”	Travel time versus time
Corridor	Route with extra features	Know the corridor name	“22A: Placer I-80”	Animations
Managed Facility	Route on a freeway with HOV/HOT facilities	Know the facility name	“D03 US50”	HOV demand versus ML demand

Accessing PeMS on the Internet



CALIFORNIA DEPARTMENT OF TRANSPORTATION

Username [Forgot your password?](#)

Welcome to PeMS

Welcome to the Caltrans Performance Measurement System (PeMS). The traffic data displayed on the map is collected in real-time from over 25,000 individual detectors. These sensors span the freeway system across all major metropolitan areas of the State of California.

PeMS is also an Archived Data User Service (ADUS) that provides over ten years of data for historical analysis. It integrates a wide variety of information from Caltrans and other local agency systems including:

- » **Traffic Detectors**
- » **Census Traffic Counts**
- » **Incidents**
- » **Vehicle Classification**
- » **Lane Closures**
- » **Weight-In-Motion**
- » **Toll Tags**
- » **Ready Inventory**

To use this site, you must **apply for an account**. Registering only takes a few minutes. Accounts are typically approved within one to two business days.

This web site has been tested with Internet Explorer 8+, Mozilla Firefox 3+ and Chrome. Your browser security settings must allow cookies and JavaScript for this site to work correctly.

Speed (mph) as of 11 Oct 2011 15:04 PDT

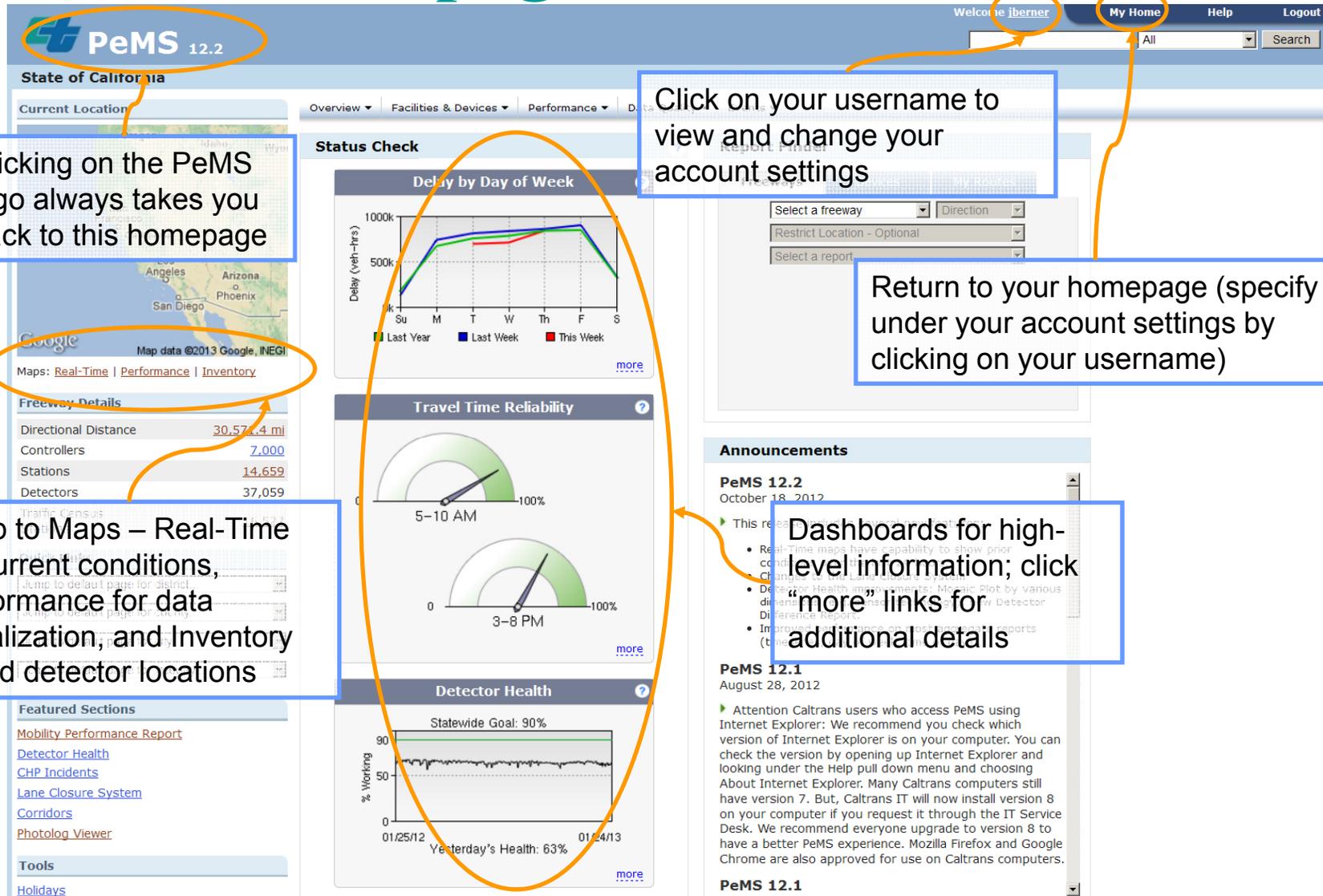
60 45 35

Back to Top | [Contact Us](#) | [Caltrans Home](#)

Login with your username and password

If you don't have an account, you can apply for one. It is usually instantaneous.

PeMS Homepage



PeMS 12.2
State of California

Welcome **iberner** | My Home | Help | Logout

Search: All

Status Check

Delay by Day of Week

Day	Last Year	Last Week	This Week
Su	~1000	~1000	~1000
Mo	~1000	~1000	~1000
Tu	~1000	~1000	~1000
W	~1000	~1000	~1000
Th	~1000	~1000	~1000
F	~1000	~1000	~1000
S	~1000	~1000	~1000

Travel Time Reliability

5-10 AM: ~100%
3-8 PM: ~100%

Detector Health

Statewide Goal: 90%

Yesterday's Health: 63%

Freeway Details

Directional Distance	30,574.4 mi
Controllers	7,000
Stations	14,659
Detectors	37,059

Announcements

PeMS 12.2
October 18, 2012

- Real-Time maps have capability to show prior conditions to the data shown on the map.
- Detector Health implemented a Bi-Color Plot by various dimensions.
- Improvements to the Performance Reports (the new Performance Reports).

PeMS 12.1
August 28, 2012

Attention Caltrans users who access PeMS using Internet Explorer: We recommend you check which version of Internet Explorer is on your computer. You can check the version by opening up Internet Explorer and looking under the Help pull down menu and choosing About Internet Explorer. Many Caltrans computers still have version 7. But, Caltrans IT will now install version 8 on your computer if you request it through the IT Service Desk. We recommend everyone upgrade to version 8 to have a better PeMS experience. Mozilla Firefox and Google Chrome are also approved for use on Caltrans computers.

Clicking on the PeMS logo always takes you back to this homepage

Click on your username to view and change your account settings

Return to your homepage (specify under your account settings by clicking on your username)

Jump to Maps – Real-Time for current conditions, Performance for data visualization, and Inventory to find detector locations

Dashboards for high-level information; click “more” links for additional details

More Homepage Navigational Tips

The screenshot shows the PeMS 12.2 homepage for the State of California. The interface includes a top navigation bar with 'Welcome jberner', 'My Home', 'Help', and 'Logout'. Below this is a search bar and a main navigation menu with tabs for 'Overview', 'Facilities & Devices', 'Performance', 'Data Quality', and 'Events'. The main content area is divided into several sections: 'Status Check' with a 'Delay by Day of Week' chart; 'Report Finder' with filters for 'Freeways', 'Devices', and 'My Routes'; 'Travel Time Reliability' with two gauge charts for 5-10 AM and 3-8 PM; 'Detector Health' with a line chart showing '% Working' against a 'Statewide Goal: 90%'; and 'Announcements' with news for PeMS 12.2 and PeMS 12.1. A left sidebar contains 'Freeway Details', 'Quick Links', and 'Featured Sections'. Orange circles highlight the 'Help' button, the main navigation tabs, the 'Report Finder' section, the 'Announcements' section, and the 'Quick Links' section. Blue callout boxes provide additional context for these highlighted areas.

Report tabs

Report Finder – a short cut for finding traffic data

System-wide help. General topics not specific to a single page (e.g., Calculations)

Important announcements

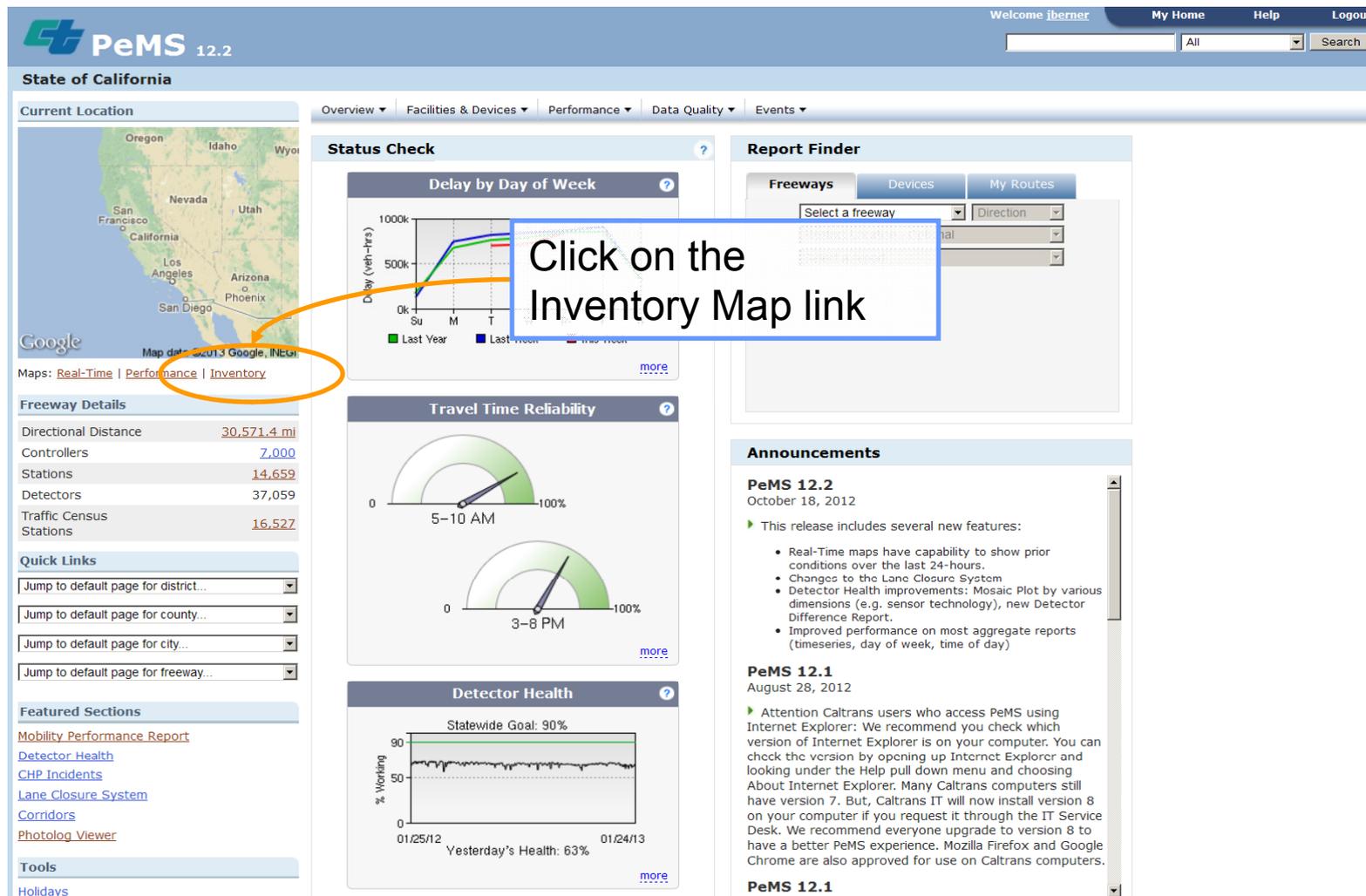
Jump to a District Dashboard, or to county, city or freeway-specific pages

How do I get to the data I want?

- Three Main Paths
 - The Inventory Map
 - By navigating through the Facilities & Devices > Freeways list from the statewide, district, or county pages
 - Primary way that we will cover
 - The Report Finder (a shortcut)

Map-Based Navigation

Best for point analysis, but great for understanding where detection is located



PeMS 12.2
State of California

Current Location: [Real-Time](#) | [Performance](#) | [Inventory](#)

Status Check

Delay by Day of Week

Delay (veh-hrs)

1000k
500k
0k

Su M T

■ Last Year ■ Last Week

Report Finder

Freeways | Devices | My Routes

Select a freeway: [Dropdown] Direction: [Dropdown]

Announcements

PeMS 12.2
October 18, 2012

This release includes several new features:

- Real-Time maps have capability to show prior conditions over the last 24-hours.
- Changes to the Lane Closure System
- Detector Health improvements: Mosaic Plot by various dimensions (e.g. sensor technology), new Detector Difference Report.
- Improved performance on most aggregate reports (timeseries, day of week, time of day)

PeMS 12.1
August 28, 2012

Attention Caltrans users who access PeMS using Internet Explorer: We recommend you check which version of Internet Explorer is on your computer. You can check the version by opening up Internet Explorer and looking under the Help pull down menu and choosing About Internet Explorer. Many Caltrans computers still have version 7. But, Caltrans IT will now install version 8 on your computer if you request it through the IT Service Desk. We recommend everyone upgrade to version 8 to have a better PeMS experience. Mozilla Firefox and Google Chrome are also approved for use on Caltrans computers.

Freeway Details

Directional Distance: 30,571.4 mi
 Controllers: 7,000
 Stations: 14,659
 Detectors: 37,059
 Traffic Census Stations: 16,527

Quick Links

Jump to default page for district...
 Jump to default page for county...
 Jump to default page for city...
 Jump to default page for freeway...

Featured Sections

[Mobility Performance Report](#)
[Detector Health](#)
[CHP Incidents](#)
[Lane Closure System](#)
[Corridors](#)
[Photolog Viewer](#)

Tools

[Holidays](#)

Travel Time Reliability

5-10 AM
3-8 PM

Detector Health

Statewide Goal: 90%

% Working

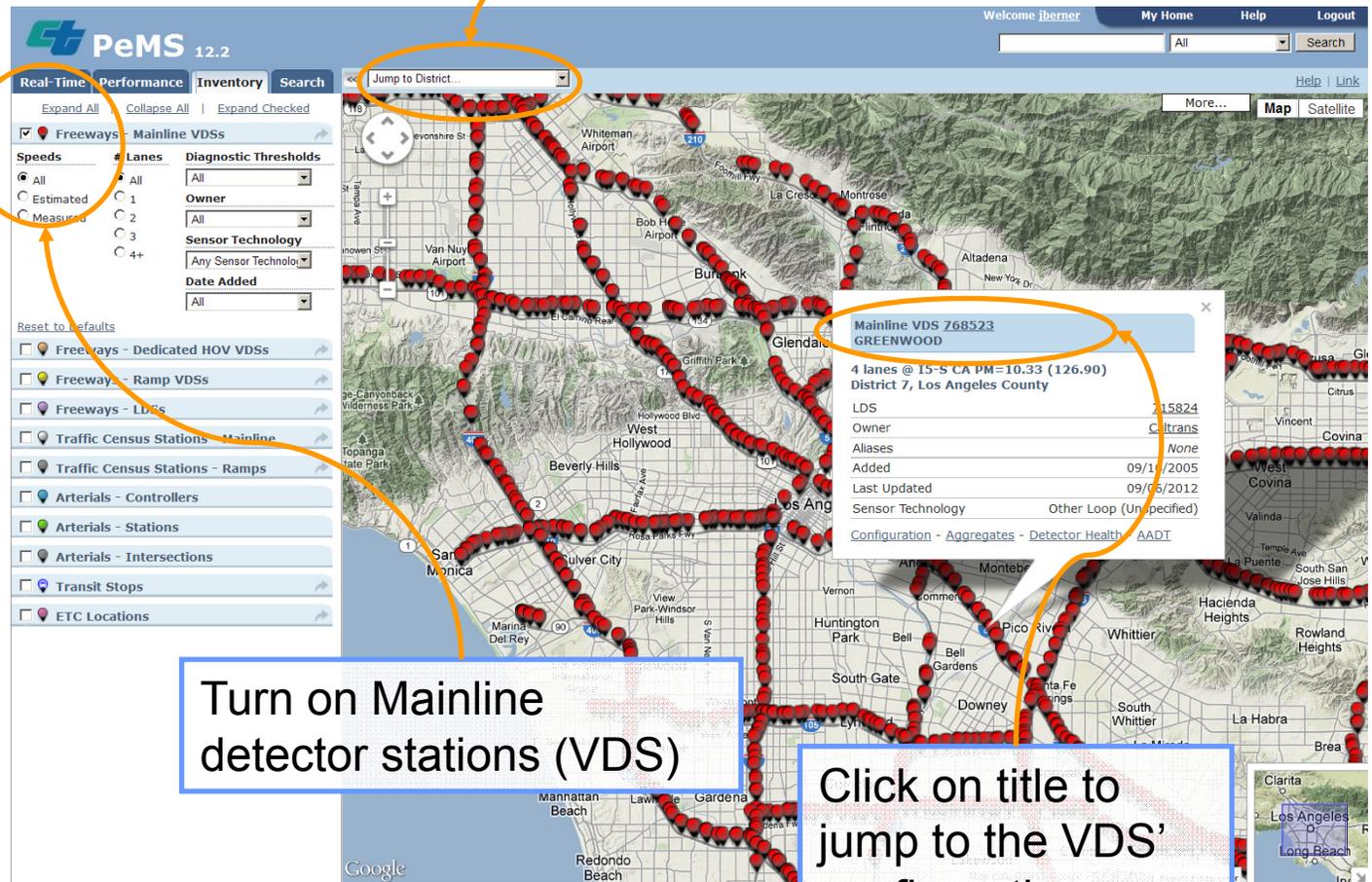
90
50
0

01/25/12 01/24/13

Yesterday's Health: 63%

Map-based Navigation

- **Inventory Map** displays devices (mainly VDS and Census Stations) over a geographic area
- You can turn on and off the various types of devices
- Click on an icon to view details and links to data



Zoom in to a district

Turn on Mainline detector stations (VDS)

Click on title to jump to the VDS' configuration page

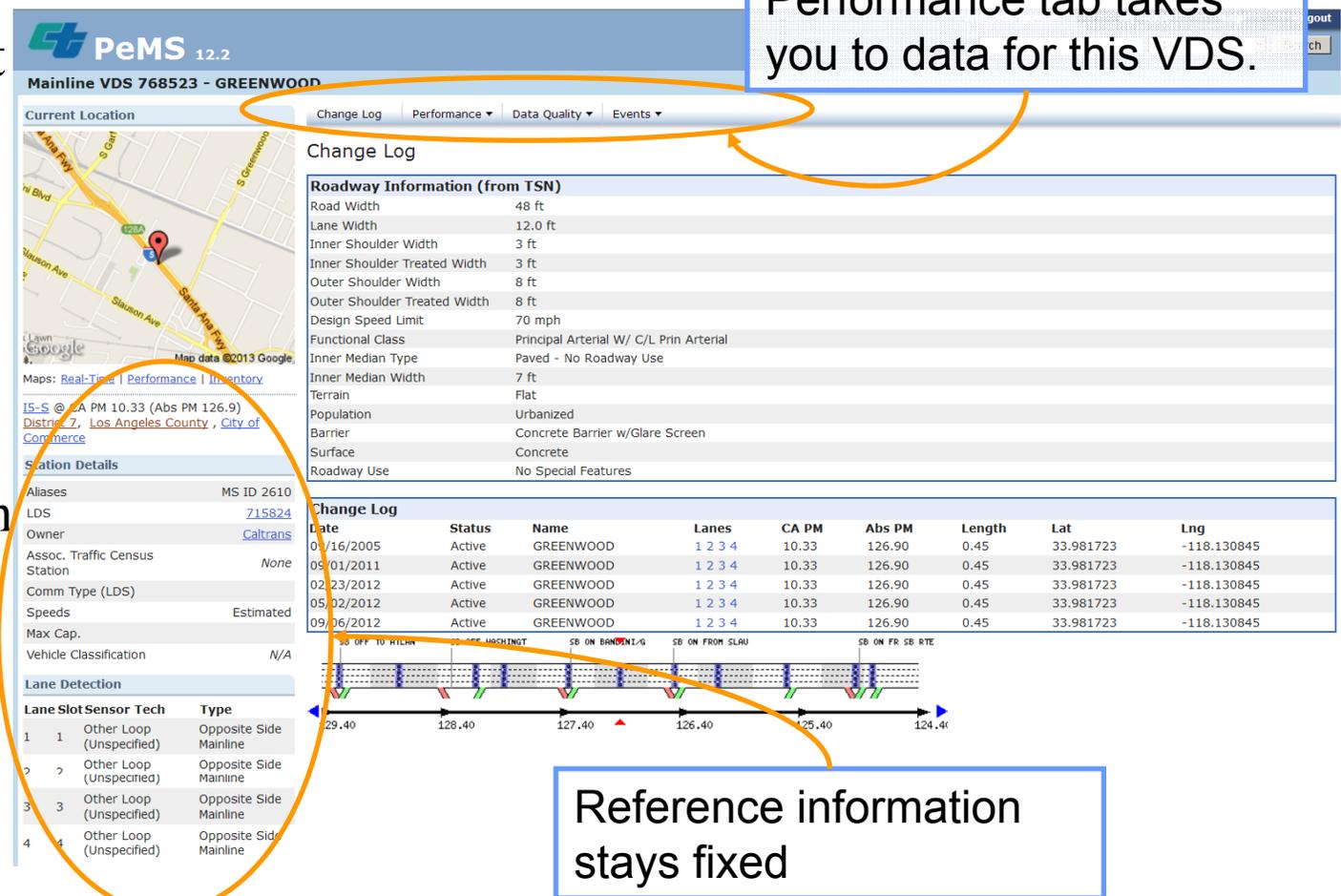
Station Configuration Page

All the reports about this object in PeMS. The Performance tab takes you to data for this VDS.

➤ Shows what we know about a station

➤ Contains:

- Map
- Description
- Configuration change history
- TSN information for this location



Change Log

Date	Status	Name	Lanes	CA PM	Abs PM	Length	Lat	Lng
01/16/2005	Active	GREENWOOD	1 2 3 4	10.33	126.90	0.45	33.981723	-118.130845
09/01/2011	Active	GREENWOOD	1 2 3 4	10.33	126.90	0.45	33.981723	-118.130845
02/23/2012	Active	GREENWOOD	1 2 3 4	10.33	126.90	0.45	33.981723	-118.130845
05/02/2012	Active	GREENWOOD	1 2 3 4	10.33	126.90	0.45	33.981723	-118.130845
09/06/2012	Active	GREENWOOD	1 2 3 4	10.33	126.90	0.45	33.981723	-118.130845

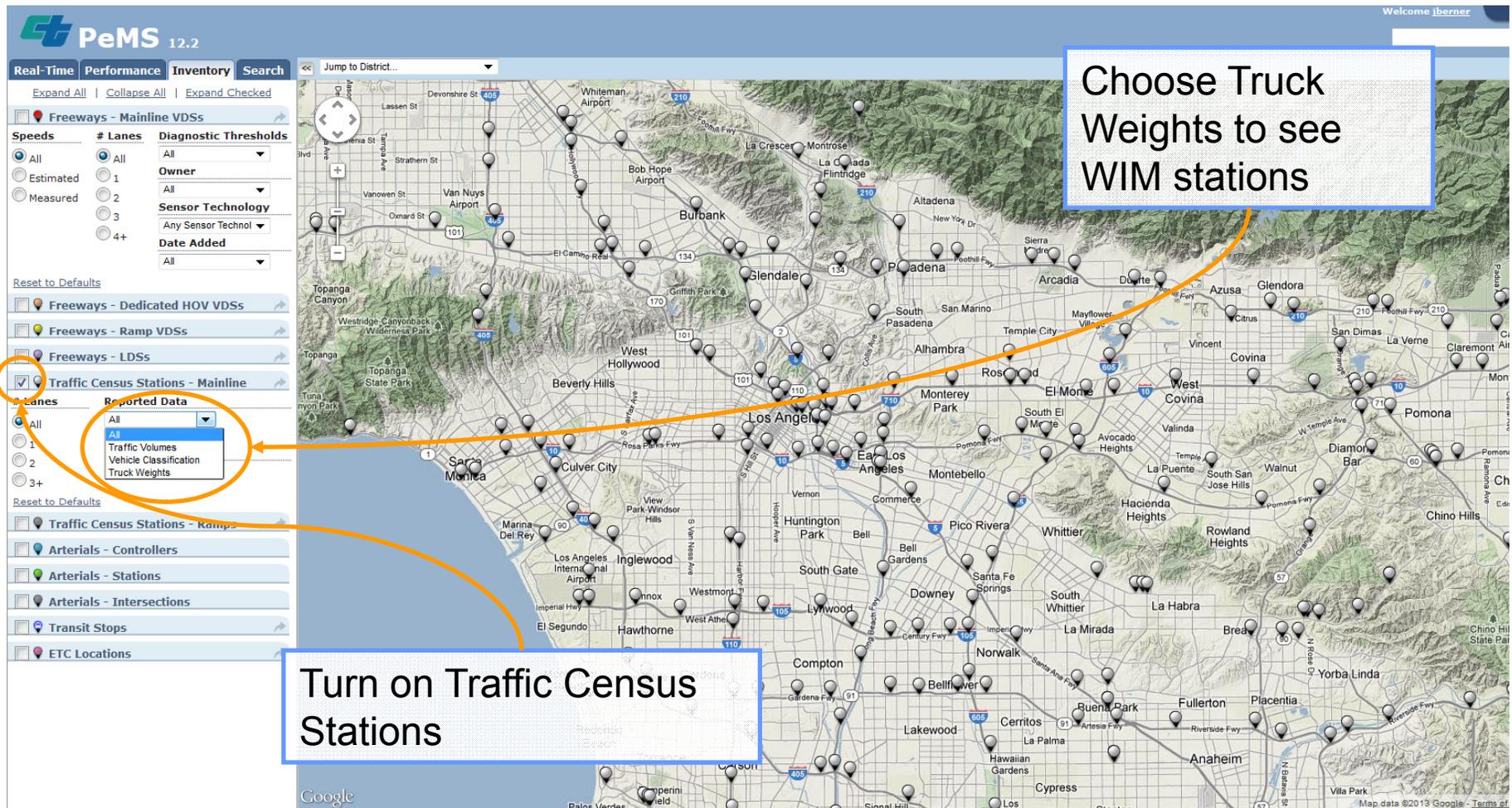
Lane Detection

Lane Slot	Sensor Tech	Type
1	Other Loop (Unspecified)	Opposite Side Mainline
2	Other Loop (Unspecified)	Opposite Side Mainline
3	Other Loop (Unspecified)	Opposite Side Mainline
4	Other Loop (Unspecified)	Opposite Side Mainline

Reference information stays fixed

Map-based Navigation

➤ Traffic Census sensor locations can also be viewed in PeMS



PeMS 12.2

Real-Time Performance Inventory Search

Expand All | Collapse All | Expand Checked

Freeways - Mainline VDSs

Speeds # Lanes Diagnostic Thresholds

All
 Estimated
 Measured

All
 1
 2
 3
 4+

Diagnostic Thresholds

Owner: All

Sensor Technology: Any Sensor Technol

Date Added: All

Reset to Defaults

Freeways - Dedicated HOV VDSs

Freeways - Ramp VDSs

Freeways - LDSs

Traffic Census Stations - Mainline

Lanes Reported Data

All
 1
 2
 3+

Traffic Volumes
 Vehicle Classification
 Truck Weights

Reset to Defaults

Traffic Census Stations - Ramps

Arterials - Controllers

Arterials - Stations

Arterials - Intersections

Transit Stops

ETC Locations

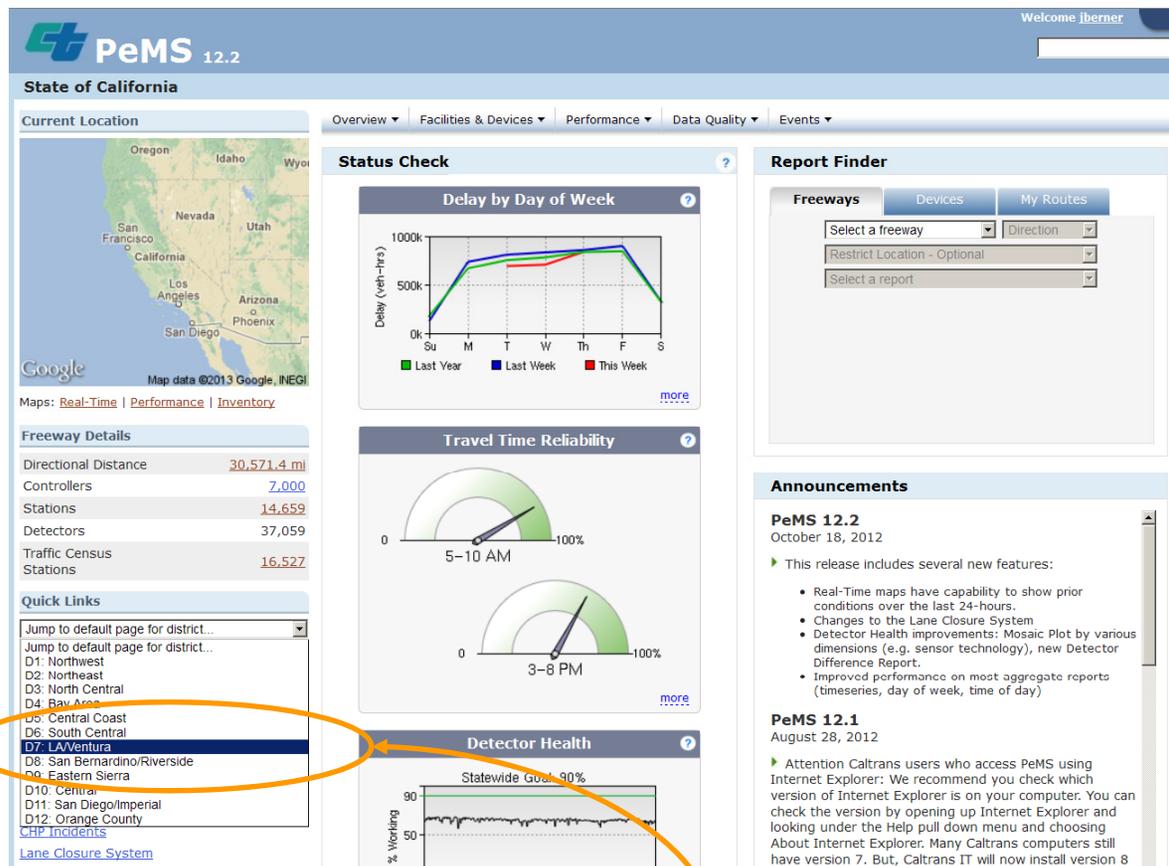
Jump to District...

Choose Truck Weights to see WIM stations

Turn on Traffic Census Stations

List-based Navigation

- We're back on the PeMS Homepage
- Useful when you want to analyze a freeway segment, instead of a single location (one VDS). Most TCR performance measure can be obtained using this navigation method.
- We can first jump to a district using the Quick Links



The screenshot shows the PeMS 12.2 interface for the State of California. The 'Quick Links' section is highlighted with an orange circle, and 'D7: LA/Ventura' is selected. A blue box with an arrow points to this selection, containing the text 'Select D7 LA/Ventura'.

Select D7 LA/Ventura

List-based Navigation

Select: Facilities & Devices > Freeways

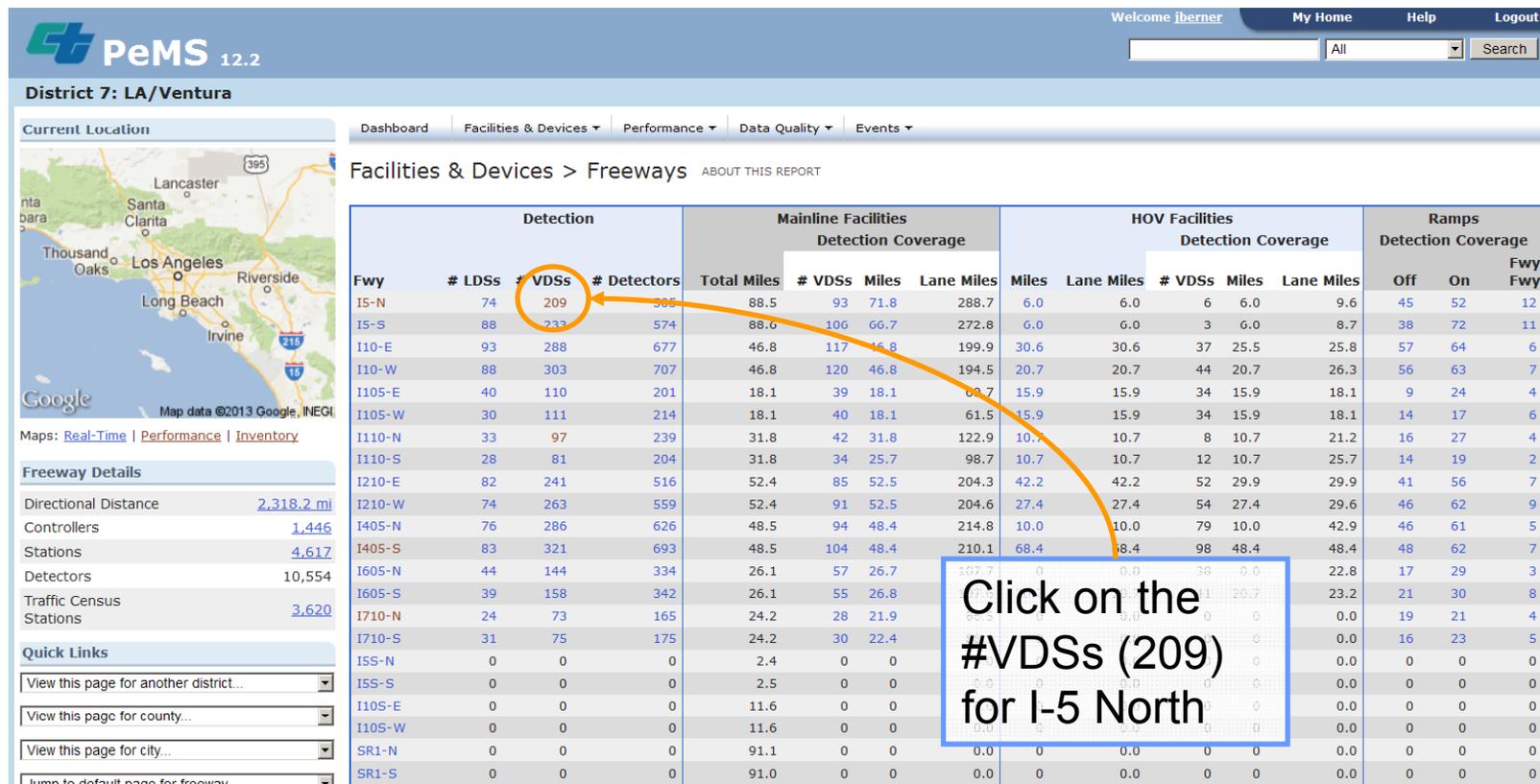
- Note that we are now on the D7 homepage
- Scroll over “Facilities & Devices” on the toolbar at the top of the page. Click on “Freeways.”

The screenshot shows the PeMS 12.2 interface for District 7: LA/Ventura. The top navigation bar includes 'Dashboard', 'Facilities & Devices', 'Performance', 'Data Quality', and 'Events'. The 'Facilities & Devices' menu is expanded, showing options like 'Freeways', 'Routes', 'Corridors', 'Managed Facilities', 'Field Elements', 'Arterials', and 'FSP Beats'. The 'Freeways' option is highlighted. Below the map, there are sections for 'Freeway Details' (Directional Distance: 2,318.2 mi, Controllers: 1,446, Stations: 4,617, Detectors: 10,554, Traffic Census Stations: 3,620) and 'Quick Links'. The 'Status Chart' displays 'Delay (veh-hrs)' over a week, comparing 'Last Year', 'Last Week', and 'This Week'. The 'Travel Time Reliability' section shows two gauges for 5-10 AM and 3-8 PM. The 'Report Finder' section allows filtering by freeway, direction, and location. The 'Announcements' section lists new features for PeMS 12.2, including real-time maps, lane closure system changes, and improved performance reports.

Indicates D7 Homepage

List-based Navigation

- Select a Freeway-Direction to analyze. We will choose the Northbound direction of I-5.



PeMS 12.2

Welcome jberner My Home Help Logout

District 7: LA/Ventura

Dashboard Facilities & Devices Performance Data Quality Events

Facilities & Devices > Freeways ABOUT THIS REPORT

Fwy	Detection			Mainline Facilities Detection Coverage				HOV Facilities Detection Coverage				Ramps Detection Coverage			
	# LDSs	# VDSs	# Detectors	Total Miles	# VDSs	Miles	Lane Miles	Miles	Lane Miles	# VDSs	Miles	Lane Miles	Off	On	Fwy Fwy
I5-N	74	209	585	88.5	93	71.8	288.7	6.0	6.0	6	6.0	9.6	45	52	12
I5-S	88	233	574	88.6	106	66.7	272.8	6.0	6.0	3	6.0	8.7	38	72	11
I10-E	93	288	677	46.8	117	45.8	199.9	30.6	30.6	37	25.5	25.8	57	64	6
I10-W	88	303	707	46.8	120	46.8	194.5	20.7	20.7	44	20.7	26.3	56	63	7
I105-E	40	110	201	18.1	39	18.1	60.7	15.9	15.9	34	15.9	18.1	9	24	4
I105-W	30	111	214	18.1	40	18.1	61.5	15.9	15.9	34	15.9	18.1	14	17	6
I110-N	33	97	239	31.8	42	31.8	122.9	10.7	10.7	8	10.7	21.2	16	27	4
I110-S	28	81	204	31.8	34	25.7	98.7	10.7	10.7	12	10.7	25.7	14	19	2
I210-E	82	241	516	52.4	85	52.5	204.3	42.2	42.2	52	29.9	29.9	41	56	7
I210-W	74	263	559	52.4	91	52.5	204.6	27.4	27.4	54	27.4	29.6	46	62	9
I405-N	76	286	626	48.5	94	48.4	214.8	10.0	10.0	79	10.0	42.9	46	61	5
I405-S	83	321	693	48.5	104	48.4	210.1	68.4	68.4	98	48.4	48.4	48	62	7
I605-N	44	144	334	26.1	57	26.7	89.7	0.0	0.0	38	0.0	22.8	17	29	3
I605-S	39	158	342	26.1	55	26.8	89.7	0.0	0.0	31	20.7	23.2	21	30	8
I710-N	24	73	165	24.2	28	21.9	88.5	0.0	0.0	0	0.0	0.0	19	21	4
I710-S	31	75	175	24.2	30	22.4	88.5	0.0	0.0	0	0.0	0.0	16	23	5
I55-N	0	0	0	2.4	0	0	0.0	0.0	0.0	0	0.0	0.0	0	0	0
I55-S	0	0	0	2.5	0	0	0.0	0.0	0.0	0	0.0	0.0	0	0	0
I105-E	0	0	0	11.6	0	0	0.0	0.0	0.0	0	0.0	0.0	0	0	0
I105-W	0	0	0	11.6	0	0	0.0	0.0	0.0	0	0.0	0.0	0	0	0
SR1-N	0	0	0	91.1	0	0	0.0	0.0	0.0	0	0.0	0.0	0	0	0
SR1-S	0	0	0	91.0	0	0	0.0	0.0	0.0	0	0.0	0.0	0	0	0

Freeway Details

- Directional Distance: 2,318.2 mi
- Controllers: 1,446
- Stations: 4,617
- Detectors: 10,554
- Traffic Census Stations: 3,620

Quick Links

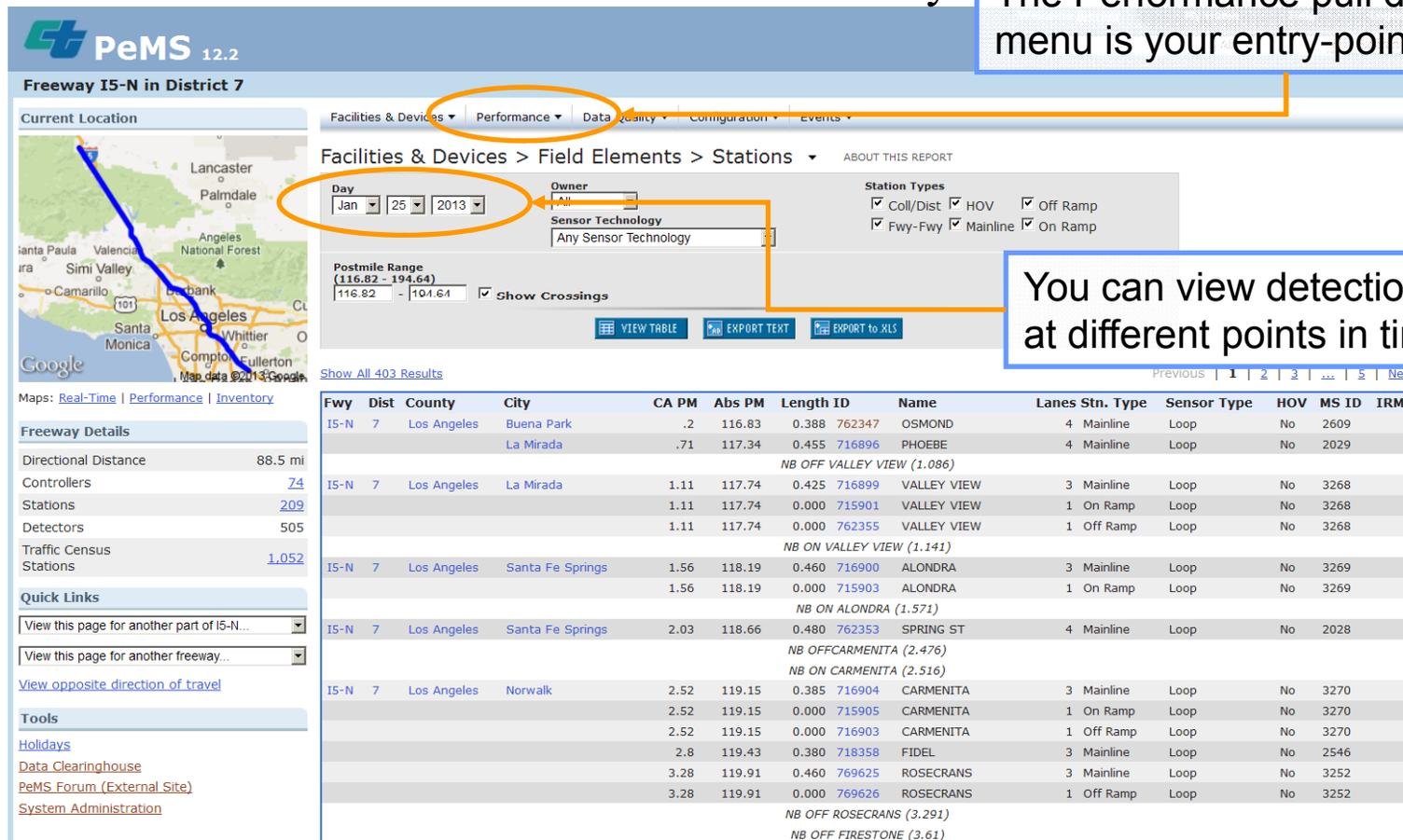
- View this page for another district...
- View this page for county...
- View this page for city...
- Jump to default page for freeway

Click on the #VDSs (209) for I-5 North

List-based Navigation

➤ This is the homepage for this freeway-direction (I-5 N) in District 7.

➤ You can see a list of all of the VDS on this facility. The Performance pull down menu is your entry-point to data



Facilities & Devices > Field Elements > Stations

Day: Jan 25 2013

Station Types: Coll/Dist, HOV, Off Ramp, Fwy-Fwy, Mainline, On Ramp

Postmile Range: 116.82 - 194.64

VIEW TABLE | EXPORT TEXT | EXPORT to XLS

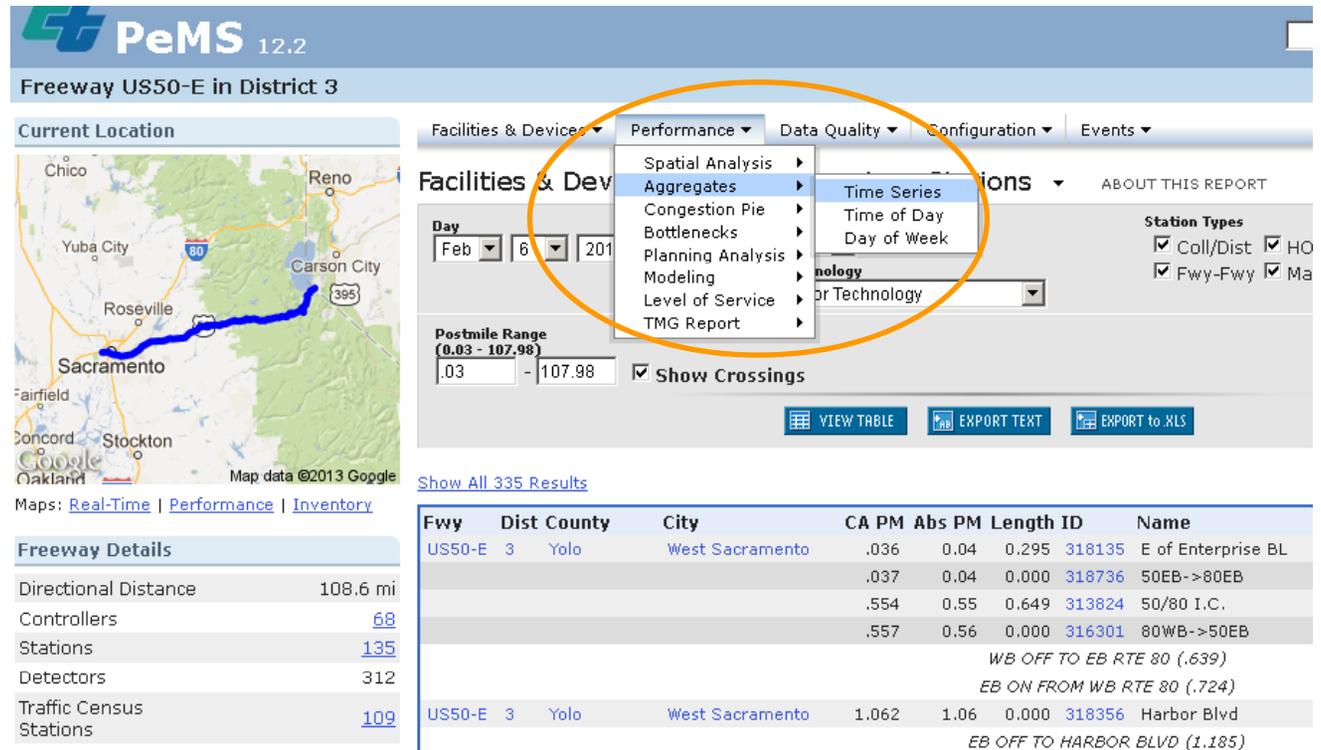
Show All 403 Results

Fwy	Dist	County	City	CA PM	Abs PM	Length	ID	Name	Lanes	Stn. Type	Sensor Type	HOV	MS ID	IRM
I5-N	7	Los Angeles	Buena Park	.2	116.83	0.388	762347	OSMOND	4	Mainline	Loop	No	2609	
			La Mirada	.71	117.34	0.455	716896	PHOEBE	4	Mainline	Loop	No	2029	
<i>NB OFF VALLEY VIEW (1.086)</i>														
I5-N	7	Los Angeles	La Mirada	1.11	117.74	0.425	716899	VALLEY VIEW	3	Mainline	Loop	No	3268	
				1.11	117.74	0.000	715901	VALLEY VIEW	1	On Ramp	Loop	No	3268	
				1.11	117.74	0.000	762355	VALLEY VIEW	1	Off Ramp	Loop	No	3268	
<i>NB ON VALLEY VIEW (1.141)</i>														
I5-N	7	Los Angeles	Santa Fe Springs	1.56	118.19	0.460	716900	ALONDRA	3	Mainline	Loop	No	3269	
				1.56	118.19	0.000	715903	ALONDRA	1	On Ramp	Loop	No	3269	
<i>NB ON ALONDRA (1.571)</i>														
I5-N	7	Los Angeles	Santa Fe Springs	2.03	118.66	0.480	762353	SPRING ST	4	Mainline	Loop	No	2028	
				<i>NB OFF CARMENITA (2.476)</i>										
<i>NB ON CARMENITA (2.516)</i>														
I5-N	7	Los Angeles	Norwalk	2.52	119.15	0.385	716904	CARMENITA	3	Mainline	Loop	No	3270	
				2.52	119.15	0.000	715905	CARMENITA	1	On Ramp	Loop	No	3270	
				2.52	119.15	0.000	716903	CARMENITA	1	Off Ramp	Loop	No	3270	
				2.8	119.43	0.380	718358	FIDEL	3	Mainline	Loop	No	2546	
I5-N	7	Los Angeles	Norwalk	3.28	119.91	0.460	769625	ROSECRANS	3	Mainline	Loop	No	3252	
				3.28	119.91	0.000	769626	ROSECRANS	1	Off Ramp	Loop	No	3252	
<i>NB OFF ROSECRANS (3.291)</i>														
<i>NB OFF FIRESTONE (3.61)</i>														

You can view detection present at different points in time

Finding Data

- Data for the freeway is found under the Performance tab
- To look at performance measures for TCR's outlined in the new TCR Guidelines including VMT and Delay, lets start with Performance > Aggregates > Time Series

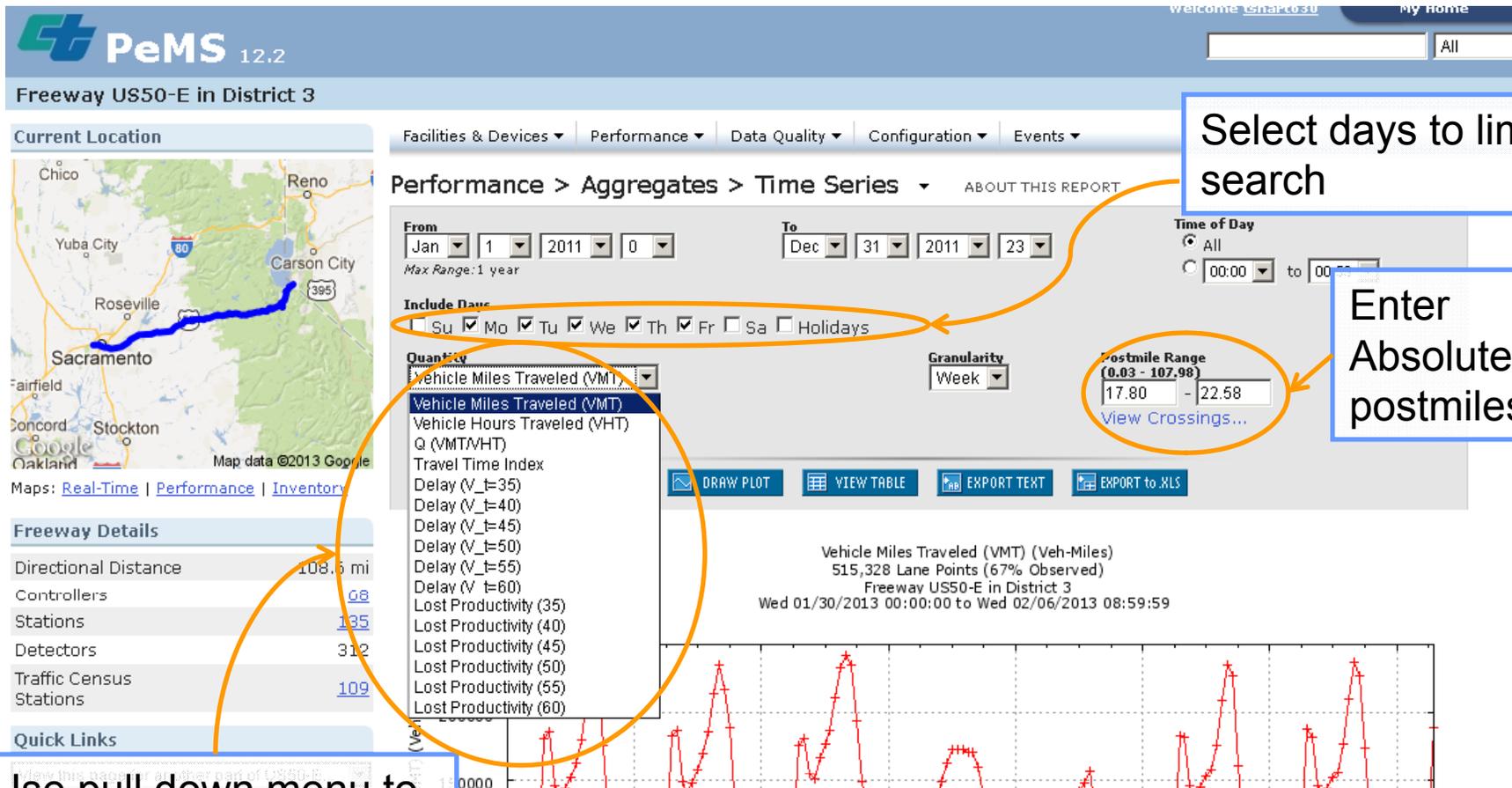


The screenshot shows the PeMS 12.2 interface for 'Freeway US50-E in District 3'. The 'Performance' dropdown menu is open, with 'Aggregates' selected, and 'Time Series' highlighted. The 'Facilities & Dev' section shows a map of the Sacramento area with a blue line representing the freeway. The 'Postmile Range' is set to 0.03 - 107.98. The 'Show Crossings' checkbox is checked. The 'VIEW TABLE' button is visible.

[Show All 335 Results](#)

Fwy	Dist	County	City	CA PM	Abs PM	Length	ID	Name
US50-E	3	Yolo	West Sacramento	.036	0.04	0.295	318135	E of Enterprise BL
				.037	0.04	0.000	318736	50EB->80EB
				.554	0.55	0.649	313824	50/80 I.C.
				.557	0.56	0.000	316301	80WB->50EB
								WB OFF TO EB RTE 80 (.639)
								EB ON FROM WB RTE 80 (.724)
US50-E	3	Yolo	West Sacramento	1.062	1.06	0.000	318356	Harbor Blvd
								EB OFF TO HARBOR BLVD (1.185)

Finding Data for TCR's



PeMS 12.2
 Freeway US50-E in District 3

Performance > Aggregates > Time Series

From: Jan 1 2011 0 **To:** Dec 31 2011 23
Max Range: 1 year

Include Days: Su Mo Tu We Th Fr Sa Holidays

Quantity: Vehicle Miles Traveled (VMT)

Granularity: Week

Postmile Range: (0.03 - 107.98)
 17.80 - 22.58
[View Crossings...](#)

Time of Day: All
 00:00 to 00:00

Freeway Details:
 Directional Distance: 108.6 mi
 Controllers: 08
 Stations: 135
 Detectors: 312
 Traffic Census Stations: 109

Vehicle Miles Traveled (VMT) (Veh-Miles)
 515,328 Lane Points (67% Observed)
 Freeway US50-E in District 3
 Wed 01/30/2013 00:00:00 to Wed 02/06/2013 08:59:59

Select days to limit search

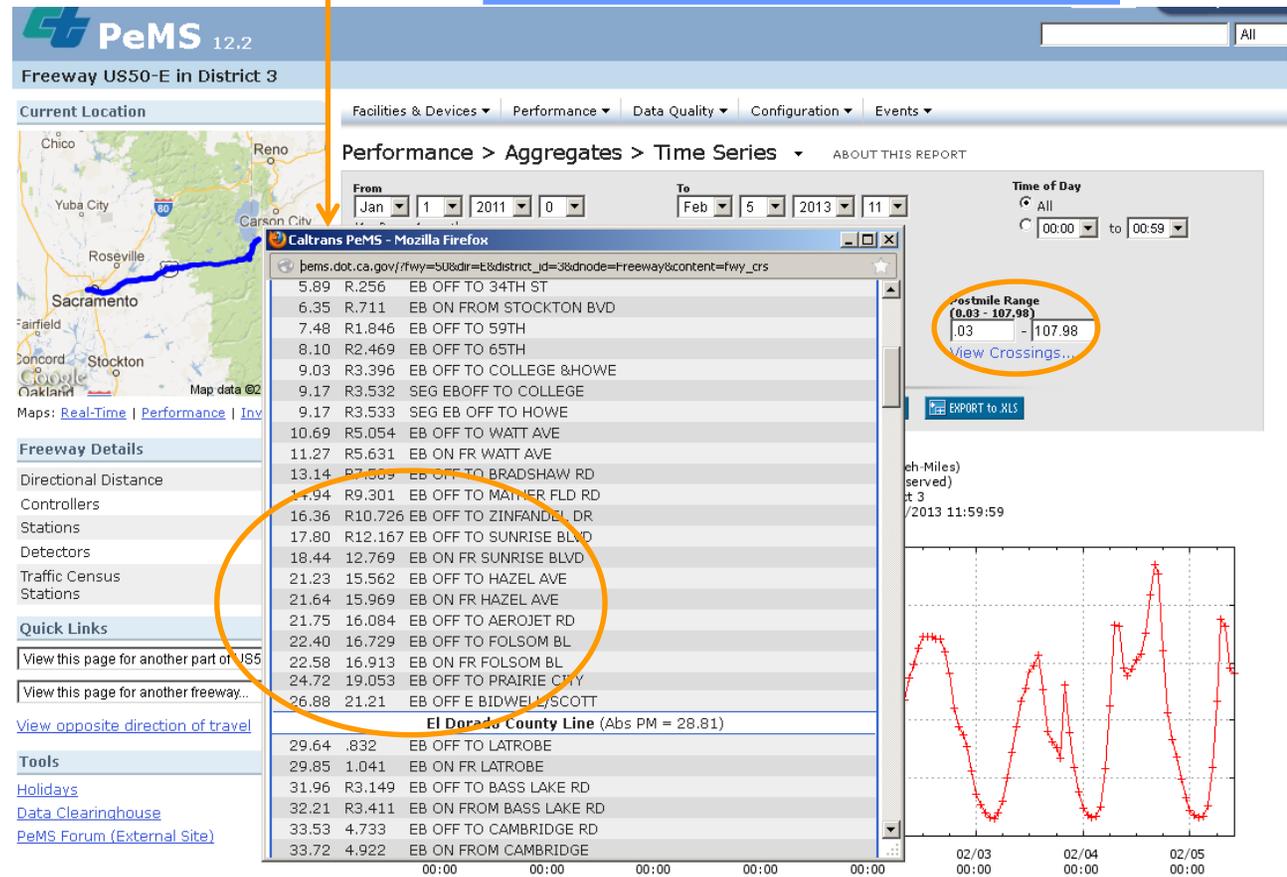
Enter Absolute postmiles

Use pull down menu to choose performance measure

Absolute Post Miles

- PeMS uses Absolute Postmiles
- Click on View Crossings to bring up list of postmiles
- This example is US-50 in D03 from Sunrise Blvd. to Folsom Blvd.

View Crossings pop-up window



PeMS 12.2
Freeway US50-E in District 3

Current Location: Performance > Aggregates > Time Series

From: Jan 1 2011 0 To: Feb 5 2013 11

Time of Day: All 00:00 to 00:59

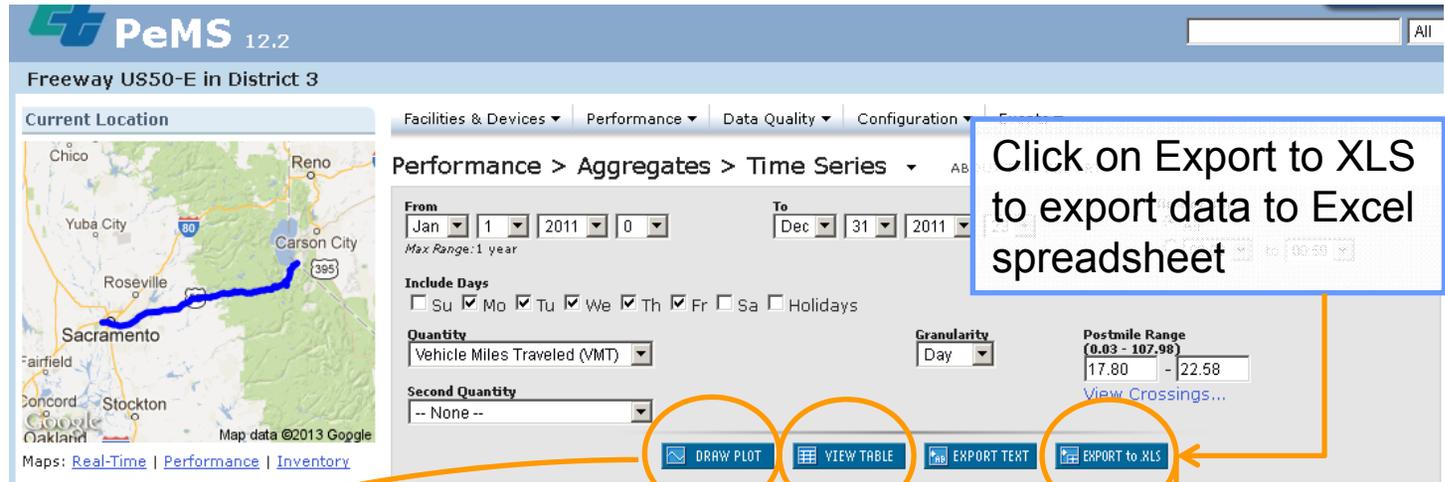
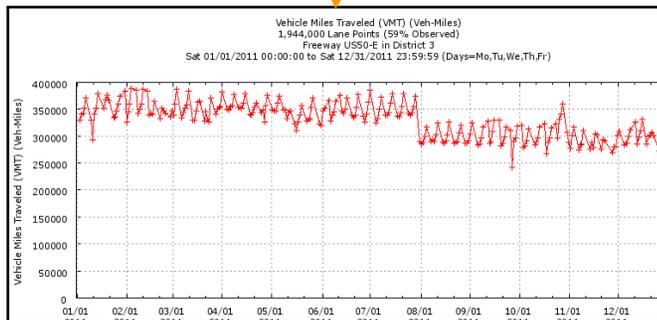
Post Mile	Station	Direction	Description
5.89	R.256	EB	OFF TO 34TH ST
6.35	R.711	EB	ON FROM STOCKTON BVD
7.48	R1.846	EB	OFF TO 59TH
8.10	R2.469	EB	OFF TO 65TH
9.03	R3.396	EB	OFF TO COLLEGE & HOWE
9.17	R3.532	SEG	EB OFF TO COLLEGE
9.17	R3.533	SEG	EB OFF TO HOWE
10.69	R5.054	EB	OFF TO WATT AVE
11.27	R5.631	EB	ON FR WATT AVE
13.14	R7.809	EB	OFF TO BRADSHAW RD
14.94	R9.301	EB	OFF TO MAINER FLD RD
16.36	R10.726	EB	OFF TO ZINFANDEL DR
17.80	R12.167	EB	OFF TO SUNRISE BLVD
18.44	12.769	EB	ON FR SUNRISE BLVD
21.23	15.562	EB	OFF TO HAZEL AVE
21.64	15.969	EB	ON FR HAZEL AVE
21.75	16.084	EB	OFF TO AEROJET RD
22.40	16.729	EB	OFF TO FOLSOM BL
22.58	16.913	EB	ON FR FOLSOM BL
24.72	19.053	EB	OFF TO PRAIRIE CITY
26.88	21.21	EB	OFF E BIDWELL/SCOTT
El Dorado County Line (Abs PM = 28.81)			
29.64	.832	EB	OFF TO LATROBE
29.85	1.041	EB	ON FR LATROBE
31.96	R3.149	EB	OFF TO BASS LAKE RD
32.21	R3.411	EB	ON FROM BASS LAKE RD
33.53	4.733	EB	OFF TO CAMBRIDGE RD
33.72	4.922	EB	ON FROM CAMBRIDGE

Post Mile Range: 0.03 - 107.98

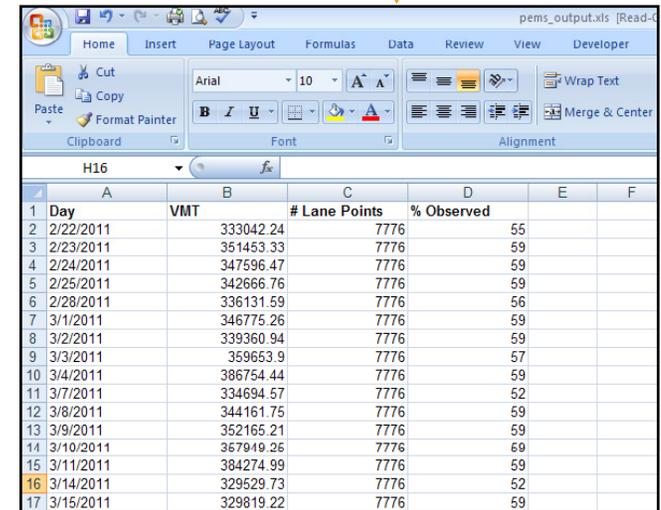
EXPORT to XLS

Time Series Graph: 02/03 00:00 to 02/05 00:00

- After making selections click on “Draw Plot” to view data graphically or “View Table” to view tabular data

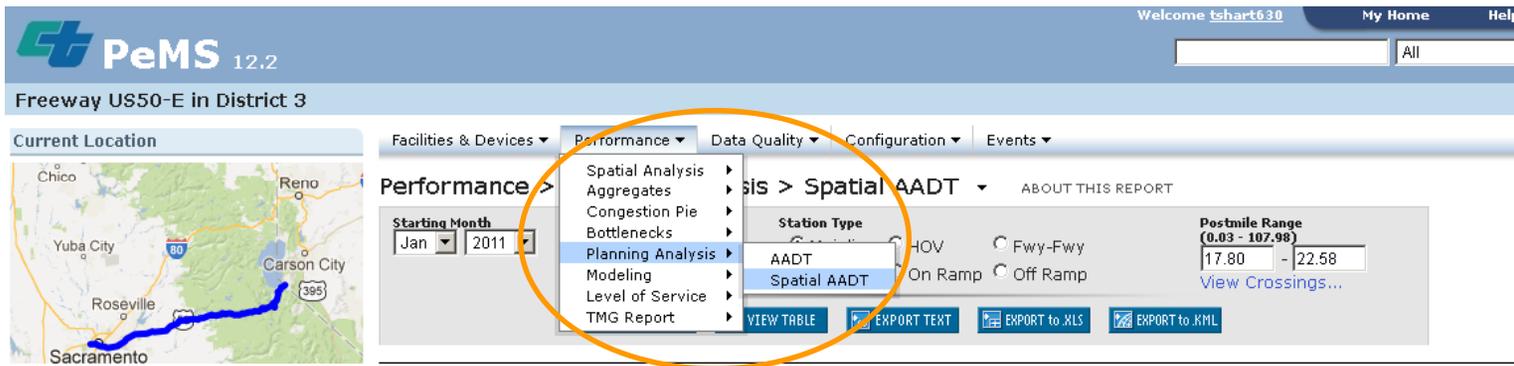
02/08/2011	341,854.18	7,776	59.0
02/09/2011	351,127.22	7,776	59.0
02/10/2011	360,544.49	7,776	59.0
02/11/2011	387,728.13	7,776	59.0
02/14/2011	384,166.49	7,776	33.0
02/15/2011	339,735.41	7,776	37.0
02/16/2011	342,417.43	7,776	48.0
02/17/2011	341,315.90	7,776	52.0
02/18/2011	365,315.17	7,776	52.0
02/22/2011	333,042.24	7,776	55.0
02/23/2011	351,453.33	7,776	59.0
02/24/2011	347,596.47	7,776	59.0
02/25/2011	342,666.76	7,776	59.0
02/28/2011	336,131.59	7,776	56.0
03/01/2011	346,775.26	7,776	59.0
03/02/2011	339,360.94	7,776	59.0
03/03/2011	359,653.90	7,776	57.0
03/04/2011	386,754.44	7,776	59.0
03/07/2011	334,694.57	7,776	52.0
03/08/2011	344,161.75	7,776	59.0
03/09/2011	352,165.21	7,776	59.0



Day	VMT	# Lane Points	% Observed
2/22/2011	333042.24	7776	55
2/23/2011	351453.33	7776	59
2/24/2011	347596.47	7776	59
2/25/2011	342666.76	7776	59
2/28/2011	336131.59	7776	56
3/1/2011	346775.26	7776	59
3/2/2011	339360.94	7776	59
3/3/2011	359653.9	7776	57
3/4/2011	386754.44	7776	59
3/7/2011	334694.57	7776	52
3/8/2011	344161.75	7776	59
3/9/2011	352165.21	7776	59
3/10/2011	367949.26	7776	69
3/11/2011	384274.99	7776	59
3/14/2011	329529.73	7776	52
3/15/2011	329819.22	7776	59

Finding AADT Data

- To find AADT within a TCR segment, go to Performance > Planning Analysis > Spatial AADT
- Can limit AADT search to defined TCR segment. Use Abs postmiles.
- The Volumes Book is a good resource for AADTs. A reason to use PeMS is to evaluate more recent data.

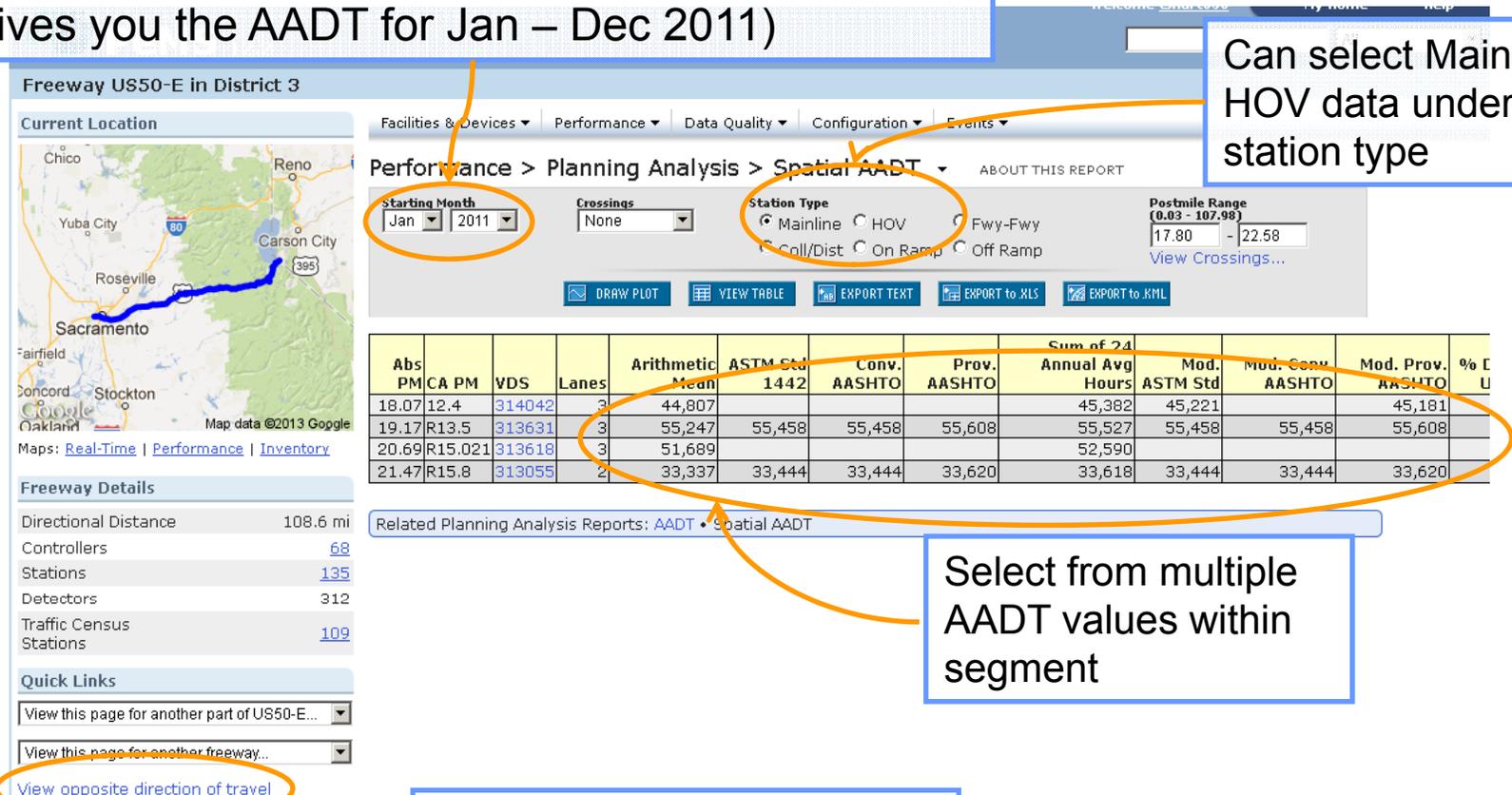


The screenshot shows the PeMS 12.2 web interface. The top navigation bar includes the PeMS logo, version 12.2, and user information (Welcome tchart630, My Home, Help). The main content area is titled "Freeway US50-E in District 3". A map on the left shows the location of the freeway segment. The "Performance" menu is open, highlighting the path: Performance > Planning Analysis > Spatial AADT. The "Starting Month" is set to Jan 2011. The "Postmile Range" is set to 17.80 - 22.58. The "Station Type" options are AADT, Spatial AADT, HOV, Fwy-Fwy, On Ramp, and Off Ramp. The "VIEW TABLE" and "EXPORT" options are visible at the bottom of the menu.

Finding AADT Data

Select the starting month and year (e.g., Jan 2011 gives you the AADT for Jan – Dec 2011)

Can select Mainline or HOV data under station type



Freeway US50-E in District 3

Performance > Planning Analysis > Spatial AADT

Starting Month: Jan 2011

Station Type: Mainline HOV Fwy-Fwy Coll/Dist On Ramp Off Ramp

Abs	CA	VDS	Lanes	Arithmetic Mean	ASTM Std	Conv. AASHTO	Prov. AASHTO	Sum of 24 Annual Avg Hours	Mod. ASTM Std	Mod. Conv. AASHTO	Mod. Prov. AASHTO	% U
18.07	12.4	314042	3	44,807	1442			45,382	45,221		45,181	
19.17	R13.5	313631	3	55,247	55,458	55,458	55,608	55,527	55,458	55,458	55,608	
20.69	R15.021	313618	3	51,689				52,590				
21.47	R15.8	313055	2	33,337	33,444	33,444	33,620	33,618	33,444	33,444	33,620	

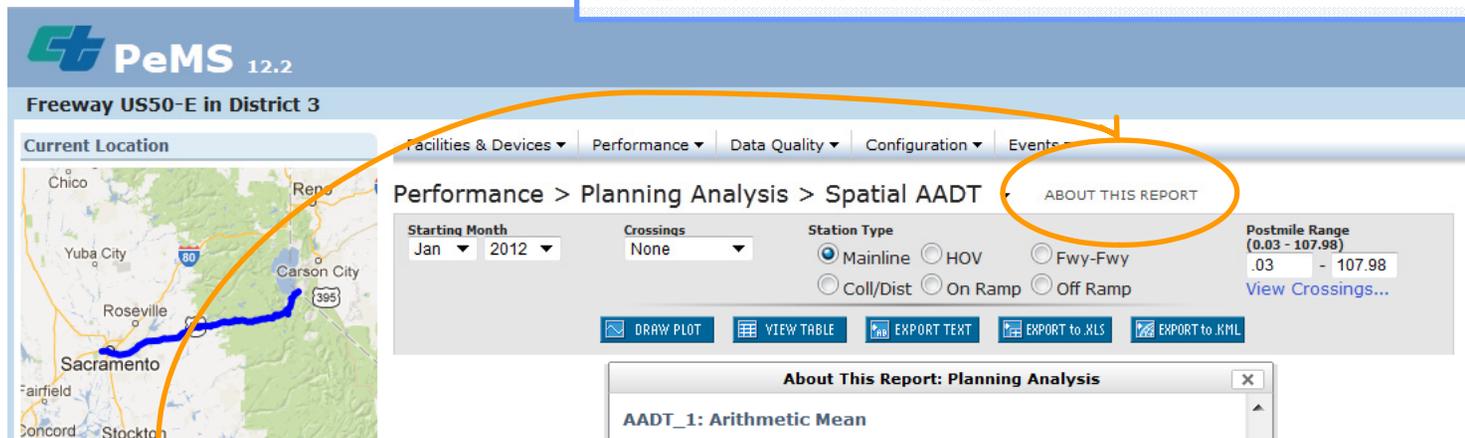
View opposite direction of travel

Select from multiple AADT values within segment

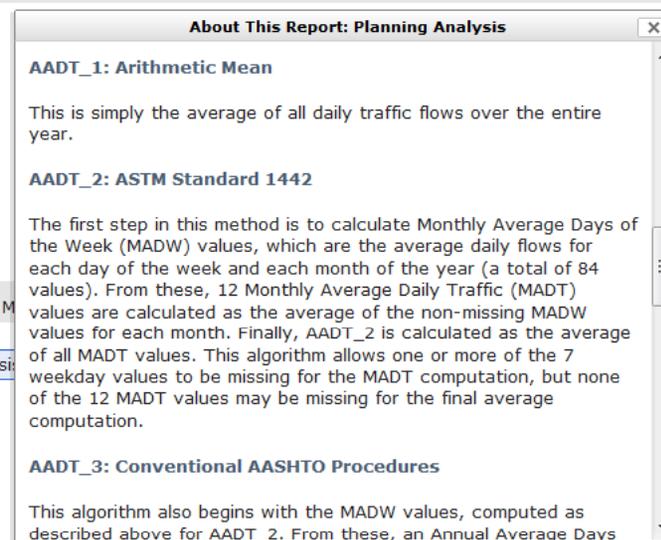
Click View opposite direction of travel to analyze opposite direction

AADT Data

Note that PeMS calculates AADT for each freeway-direction separately, and also separates the mainline AADT from HOV AADT



About This Report is a resource for more information about the report calculations. Clicking on it will bring up a pop-up window. Here we can read about the different AADT calculations.



About This Report: Planning Analysis

AADT_1: Arithmetic Mean

This is simply the average of all daily traffic flows over the entire year.

AADT_2: ASTM Standard 1442

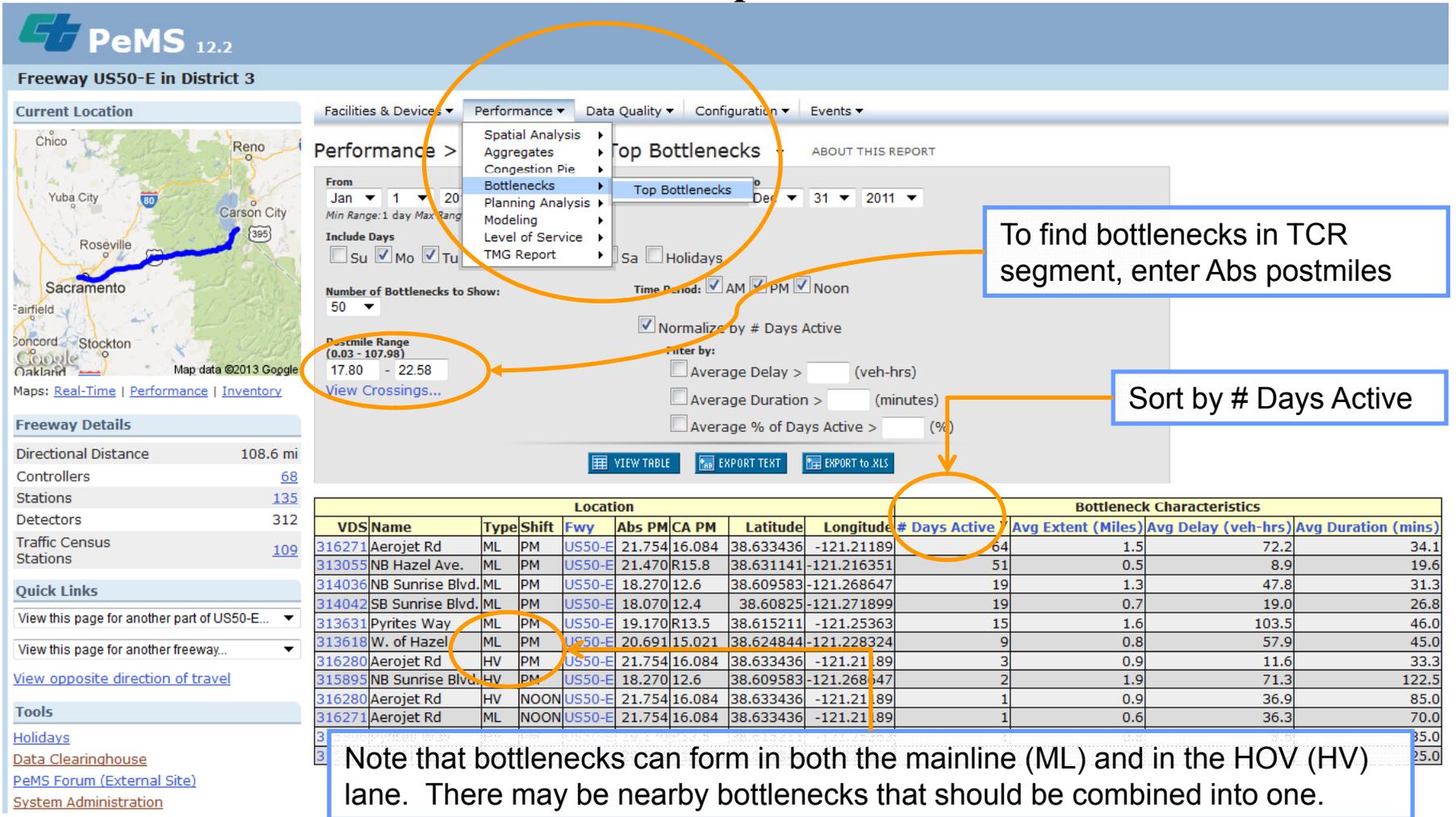
The first step in this method is to calculate Monthly Average Days of the Week (MADW) values, which are the average daily flows for each day of the week and each month of the year (a total of 84 values). From these, 12 Monthly Average Daily Traffic (MADT) values are calculated as the average of the non-missing MADW values for each month. Finally, AADT_2 is calculated as the average of all MADT values. This algorithm allows one or more of the 7 weekday values to be missing for the MADT computation, but none of the 12 MADT values may be missing for the final average computation.

AADT_3: Conventional AASHTO Procedures

This algorithm also begins with the MADW values, computed as described above for AADT_2. From these, an Annual Average Days

Finding Bottlenecks

Select Performance > Bottlenecks > Top Bottlenecks



Performance > Bottlenecks > Top Bottlenecks

Freeway US50-E in District 3

From: Jan 1 2011
 Min Range: 1 day Max Range: 31 days
 Include Days: Su Mo Tu We Th Fr Sa Holidays
 Number of Bottlenecks to Show: 50
 Postmile Range (0.03 - 107.98): 17.80 - 22.58
 Time Period: AM PM Noon
 Normalize by # Days Active
 Filter by:
 Average Delay > (veh-hrs)
 Average Duration > (minutes)
 Average % of Days Active > (%)

Location									Bottleneck Characteristics			
VDS	Name	Type	Shift	Fwy	Abs PM	CA PM	Latitude	Longitude	# Days Active	Avg Extent (Miles)	Avg Delay (veh-hrs)	Avg Duration (mins)
316271	Aerojet Rd	ML	PM	US50-E	21.754	16.084	38.633436	-121.21189	64	1.5	72.2	34.1
313055	NB Hazel Ave.	ML	PM	US50-E	21.470	R15.8	38.631141	-121.216351	51	0.5	8.9	19.6
314036	NB Sunrise Blvd.	ML	PM	US50-E	18.270	12.6	38.609583	-121.268647	19	1.3	47.8	31.3
314042	SB Sunrise Blvd.	ML	PM	US50-E	18.070	12.4	38.60825	-121.271899	19	0.7	19.0	26.8
313631	Pyrites Way	ML	PM	US50-E	19.170	R13.5	38.615211	-121.25363	15	1.6	103.5	46.0
313618	W. of Hazel	ML	PM	US50-E	20.691	15.021	38.624844	-121.228324	9	0.8	57.9	45.0
316280	Aerojet Rd	HV	PM	US50-E	21.754	16.084	38.633436	-121.21189	3	0.9	11.6	33.3
315895	NB Sunrise Blvd.	HV	PM	US50-E	18.270	12.6	38.609583	-121.268647	2	1.9	71.3	122.5
316280	Aerojet Rd	HV	NOON	US50-E	21.754	16.084	38.633436	-121.21189	1	0.9	36.9	85.0
316271	Aerojet Rd	ML	NOON	US50-E	21.754	16.084	38.633436	-121.21189	1	0.6	36.3	70.0
316271	Aerojet Rd	ML	PM	US50-E	21.754	16.084	38.633436	-121.21189	3	1.5	72.2	34.1
313055	NB Hazel Ave.	ML	PM	US50-E	21.470	R15.8	38.631141	-121.216351	51	0.5	8.9	19.6
314036	NB Sunrise Blvd.	ML	PM	US50-E	18.270	12.6	38.609583	-121.268647	19	1.3	47.8	31.3
314042	SB Sunrise Blvd.	ML	PM	US50-E	18.070	12.4	38.60825	-121.271899	19	0.7	19.0	26.8
313631	Pyrites Way	ML	PM	US50-E	19.170	R13.5	38.615211	-121.25363	15	1.6	103.5	46.0
313618	W. of Hazel	ML	PM	US50-E	20.691	15.021	38.624844	-121.228324	9	0.8	57.9	45.0
316280	Aerojet Rd	HV	PM	US50-E	21.754	16.084	38.633436	-121.21189	3	0.9	11.6	33.3
315895	NB Sunrise Blvd.	HV	PM	US50-E	18.270	12.6	38.609583	-121.268647	2	1.9	71.3	122.5
316280	Aerojet Rd	HV	NOON	US50-E	21.754	16.084	38.633436	-121.21189	1	0.9	36.9	85.0
316271	Aerojet Rd	ML	NOON	US50-E	21.754	16.084	38.633436	-121.21189	1	0.6	36.3	70.0
316271	Aerojet Rd	ML	PM	US50-E	21.754	16.084	38.633436	-121.21189	3	1.5	72.2	34.1
313055	NB Hazel Ave.	ML	PM	US50-E	21.470	R15.8	38.631141	-121.216351	51	0.5	8.9	19.6
314036	NB Sunrise Blvd.	ML	PM	US50-E	18.270	12.6	38.609583	-121.268647	19	1.3	47.8	31.3
314042	SB Sunrise Blvd.	ML	PM	US50-E	18.070	12.4	38.60825	-121.271899	19	0.7	19.0	26.8
313631	Pyrites Way	ML	PM	US50-E	19.170	R13.5	38.615211	-121.25363	15	1.6	103.5	46.0
313618	W. of Hazel	ML	PM	US50-E	20.691	15.021	38.624844	-121.228324	9	0.8	57.9	45.0
316280	Aerojet Rd	HV	PM	US50-E	21.754	16.084	38.633436	-121.21189	3	0.9	11.6	33.3
315895	NB Sunrise Blvd.	HV	PM	US50-E	18.270	12.6	38.609583	-121.268647	2	1.9	71.3	122.5
316280	Aerojet Rd	HV	NOON	US50-E	21.754	16.084	38.633436	-121.21189	1	0.9	36.9	85.0
316271	Aerojet Rd	ML	NOON	US50-E	21.754	16.084	38.633436	-121.21189	1	0.6	36.3	70.0

Tools: [Holidays](#), [Data Clearinghouse](#), [PeMS Forum \(External Site\)](#), [System Administration](#)

To find bottlenecks in TCR segment, enter Abs postmiles

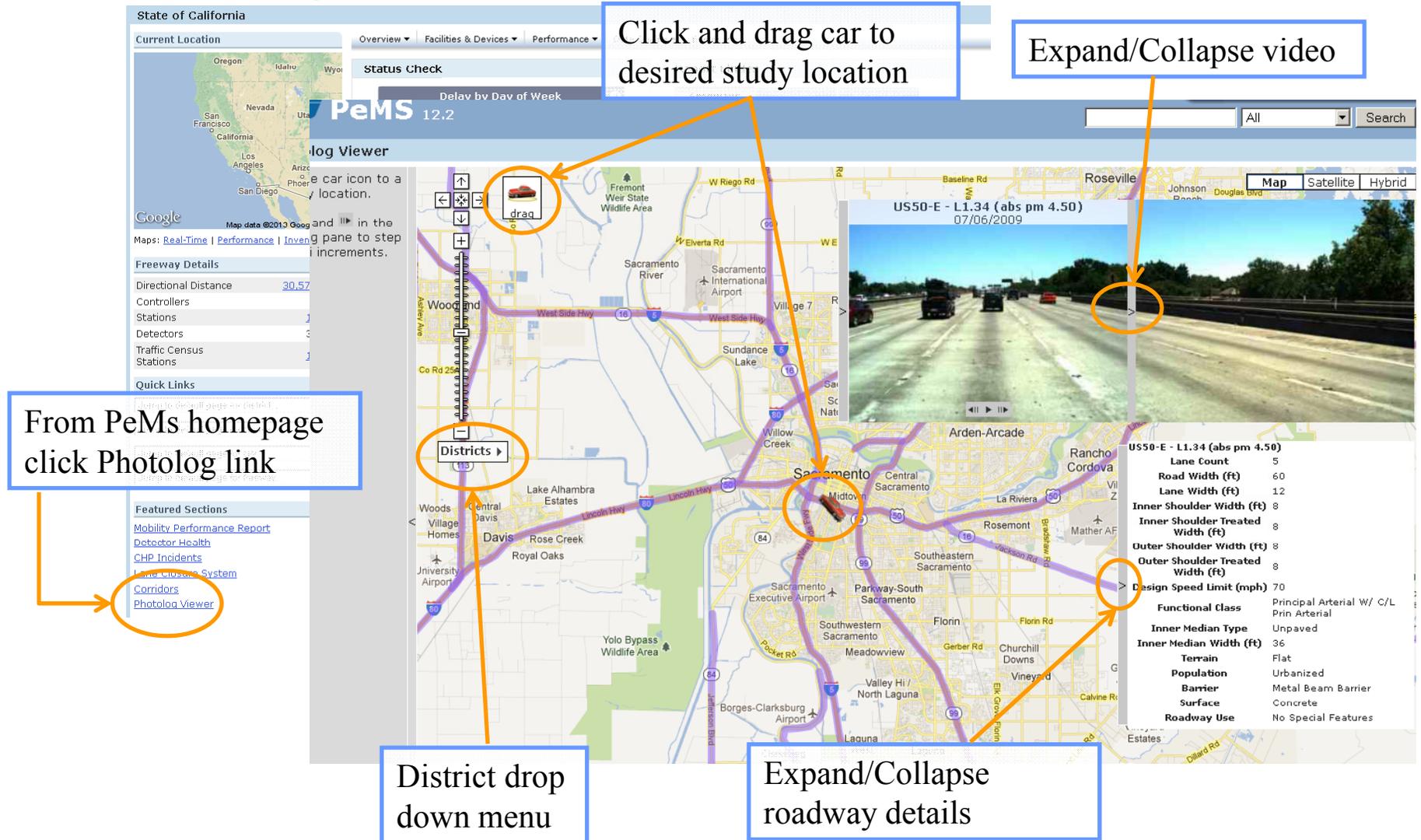
Sort by # Days Active

Note that bottlenecks can form in both the mainline (ML) and in the HOV (HV) lane. There may be nearby bottlenecks that should be combined into one.

Tips for Analyzing Bottlenecks

- Traffic Operations prepares the Mobility Performance Report (MPR – formerly HICOMP) and we evaluate bottlenecks
 - Over a calendar year (e.g., Jan 1, 2012 to Dec 31, 2012)
 - Look for bottlenecks active on at least 50 days (or 20% of all weekdays) in the year
 - Average duration of at least 15 minutes
 - Average vehicle hours of delay of at least 100
 - Goal: find the recurrent bottlenecks resulting in significant congestion

Photolog Interface



Click and drag car to desired study location

Expand/Collapse video

From PeMs homepage click Photolog link

District drop down menu

Expand/Collapse roadway details

US50-E - L1.34 (abs pm 4.50)
07/06/2009

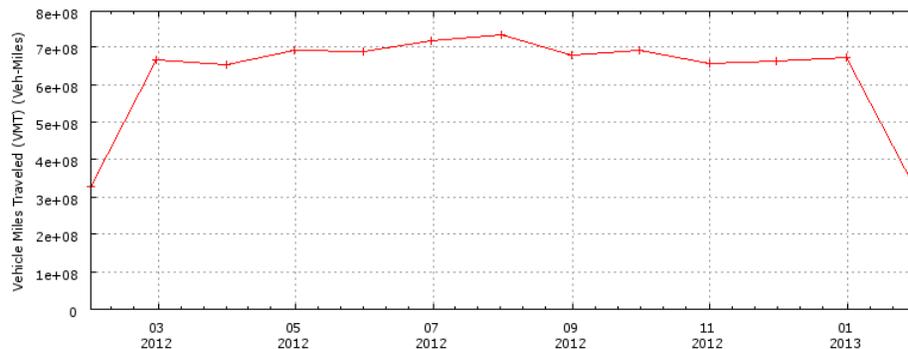
Lane Count	5
Road Width (ft)	60
Lane Width (ft)	12
Inner Shoulder Width (ft)	8
Inner Shoulder Treated Width (ft)	8
Outer Shoulder Width (ft)	8
Outer Shoulder Treated Width (ft)	8
Design Speed Limit (mph)	70
Functional Class	Principal Arterial W/ C/L Prin Arterial
Inner Median Type	Unpaved
Inner Median Width (ft)	36
Terrain	Flat
Population	Urbanized
Barrier	Metal Beam Barrier
Surface	Concrete
Roadway Use	No Special Features

PeMS Best Practices

- Be mindful of Detector Health (Percent Observed)
- Shown in plots and tables, and in Excel downloads
- PeMS imputes, or estimates, data for whatever percentage is not observed

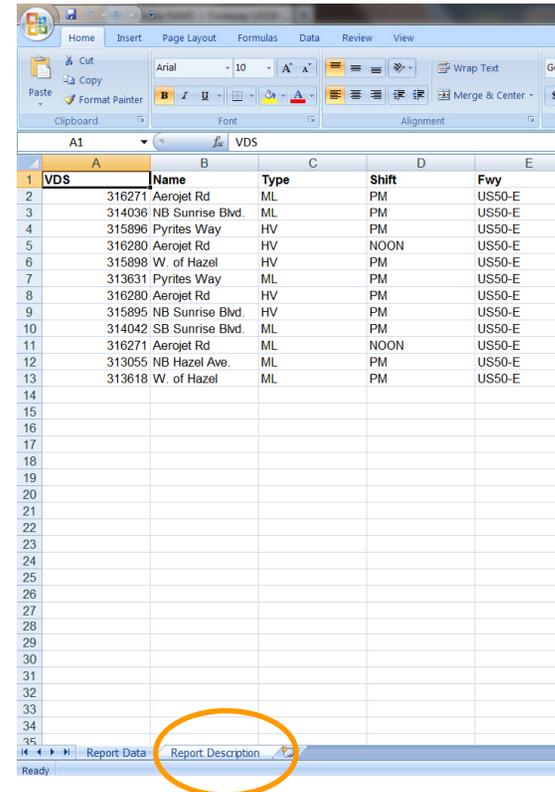
Month	VMT	Data Quality	
		# Lane Points	% Observed
02/01/2012	327,839,641.43	8,199,360	69.0
03/01/2012	667,115,614.82	16,895,823	66.0
04/01/2012	653,191,926.05	16,372,800	67.0
05/01/2012	692,725,579.62	17,142,878	68.0
06/01/2012	689,017,774.83	16,666,560	66.0
07/01/2012	716,630,584.86	17,293,195	62.0
08/01/2012	731,667,663.92	17,667,660	62.0
09/01/2012	678,595,405.85	17,207,671	62.0
10/01/2012	690,290,415.15	17,850,571	59.0
11/01/2012	656,737,317.83	17,241,695	70.0
12/01/2012	662,876,513.28	17,872,697	68.0
01/01/2013	672,808,189.30	17,885,654	65.0
02/01/2013	314,671,550.38	8,299,830	68.0
Total	8,154,168,177.32	206,596,394.00	65.3

Vehicle Miles Traveled (VMT) (Veh-Miles)
 206,596,394 Lane Points (65% Observed)
 District 3: North Central
 Wed 02/15/2012 00:00:00 to Fri 02/15/2013 07:59:59

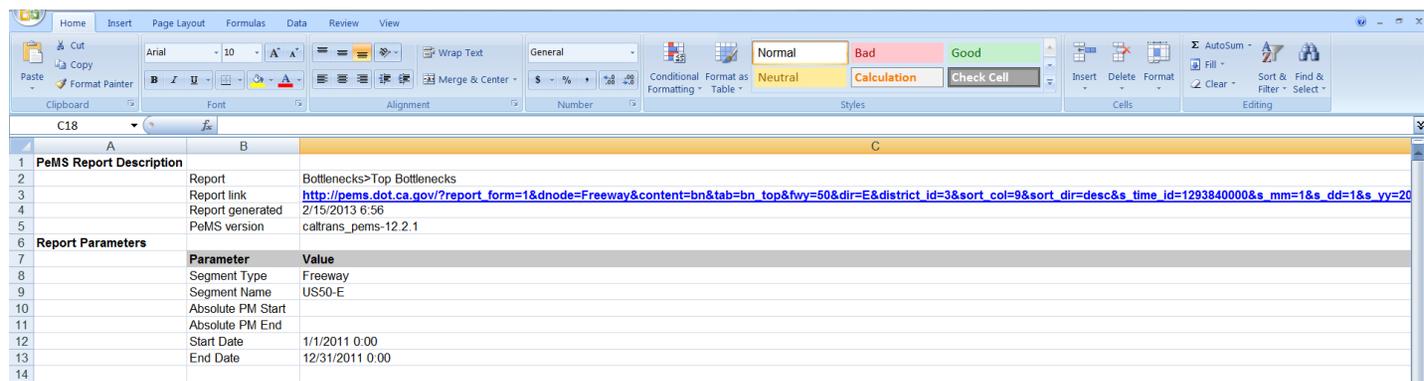


PeMS Best Practices

- Save the data you are using to Excel. This way, you can refer back to it and have a record of where you got the data
- View the Report Description tab for the URL of the report, in case you can't find your way back.



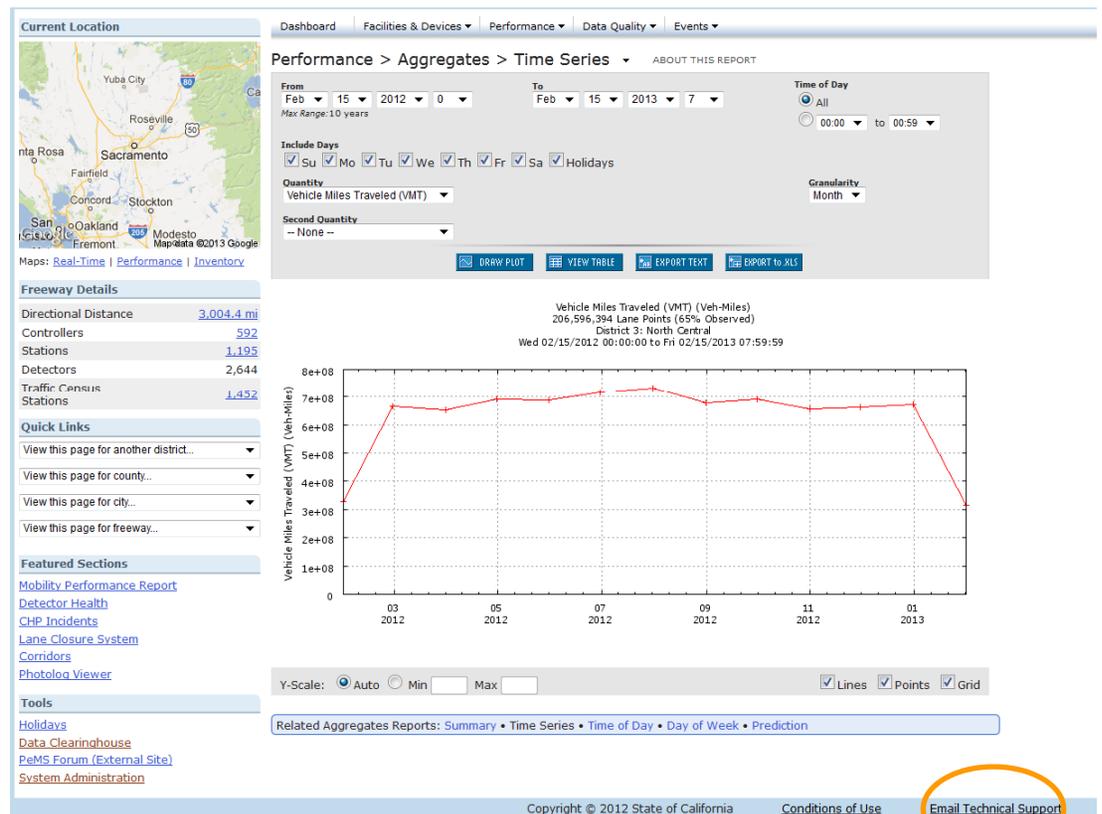
VDS	Name	Type	Shift	Fwy
316271	Aerojet Rd	ML	PM	US50-E
314036	NB Sunrise Blvd.	ML	PM	US50-E
315896	Pyrites Way	HV	PM	US50-E
316280	Aerojet Rd	HV	NOON	US50-E
315898	W. of Hazel	HV	PM	US50-E
313631	Pyrites Way	ML	PM	US50-E
316280	Aerojet Rd	HV	PM	US50-E
315895	NB Sunrise Blvd.	HV	PM	US50-E
314042	SB Sunrise Blvd.	ML	PM	US50-E
316271	Aerojet Rd	ML	NOON	US50-E
313055	NB Hazel Ave.	ML	PM	US50-E
313618	W. of Hazel	ML	PM	US50-E



PeMS Report Description	Parameter	Value
Report	Segment Type	Freeway
Report link	Segment Name	US50-E
Report generated	Absolute PM Start	
PeMS version	Absolute PM End	
	Start Date	1/1/2011 0:00
	End Date	12/31/2011 0:00

PeMS Best Practices

- Recheck your postmile ranges when you switch to the opposite direction of freeway – sometimes they get reset.
- Email Technical Support with questions, or email Jane or Tim directly.
- We are here to help!



Performance > Aggregates > Time Series

From: Feb 15 2012 0 To: Feb 15 2013 7
 Max Range: 10 years

Time of Day: All 00:00 to 00:59

Include Days: Su Mo Tu We Th Fr Sa Holidays

Quantity: Vehicle Miles Traveled (VMT)
 Second Quantity: -- None --

Grandularity: Month

Buttons: DRAW PLOT, VIEW TABLE, EXPORT TEXT, EXPORT to XLS

Vehicle Miles Traveled (VMT) (Veh-Miles)
 205,596,394 Lane Points (65% Observed)
 District 3: North Central
 Wed 02/15/2012 00:00:00 to Fri 02/15/2013 07:59:59

Date	VMT (Veh-Miles)
03/2012	3.5e+08
04/2012	7.0e+08
05/2012	7.0e+08
06/2012	7.0e+08
07/2012	7.5e+08
08/2012	7.5e+08
09/2012	7.0e+08
10/2012	7.0e+08
11/2012	7.0e+08
12/2012	7.0e+08
01/2013	7.0e+08
02/2013	3.5e+08

Y-Scale: Auto Min Max

Options: Lines Points Grid

Related Aggregates Reports: Summary • Time Series • Time of Day • Day of Week • Prediction

Copyright © 2012 State of California | Conditions of Use | [Email Technical Support](#)

Going Forward

- Check out our instructions for using PeMS for TCR's
 - More details than presented here
- As the TCR process evolves, we will do our best to update these instructions so that they reflect agreed-upon methodologies and best practices
- Let us know if you would like to request in-person training

In Summary...

- PeMS is a dynamic system that allows for convenient retrieval of performance measurement data
- PeMS has a rich variety of features and reports on traffic data
- PeMS has a large archive of data, especially on urban freeways
- PeMS is one more tool for you to use in system planning

Thank you!