



## Director's Message

Caltrans and its partners are launching a wave of road repair and construction projects around the state, and there will be a level of activity that has not been seen for decades as we begin to restore our vast but battered State Highway System.

As Caltrans director, I'm thrilled to play a role in this coming transformation being made possible by the Road Repair and Accountability Act of 2017, known as Senate Bill 1 (SB 1).

On the front lines, though, will be the thousands of workers who will be doing the hard, physical, and dangerous jobs of rebuilding and maintaining the state roadways — often as vehicles speed by within mere feet of them.

Highway construction and maintenance is one of the most hazardous jobs in California, and the nation. With more work zones being set up in the next few years, we are taking every step we can to make sure that everyone — those wearing Caltrans orange, highway contractors, truck drivers, or families on vacation — gets home safely.

We're being helped by advances in equipment technology that reduce the exposure of work crews to potentially deadly roadways. We are using, or testing new generation remote-controlled mowers, motorized pothole patchers, automated flagging devices and multiuse trimming machines that work faster and eliminate the need for manual vegetation clearing, to name a few safety enhancements.

Caltrans also is employing a best practices approach for construction projects to safely guide motorists through as conditions change.

But even the most secure cocoon we can construct around our work crews can be shattered in an instant if those traveling the roads don't have the same focus.

Our message of safety first and foremost is brought

home every spring, when we mourn and honor those workers who did not make it home to the embrace of their families. Individual Caltrans regional districts staged their own Fallen Workers Memorials as part of Caltrans Safety Awareness Week, culminating in a large contingent of employees and families gathering on the steps of the state Capitol in Sacramento.

Unfortunately, this year we inscribed two more names on our memorial. We paid special tribute to a bridge toll collector who was killed when a suspected drunken driver crashed into her booth, and a painting supervisor who was shot and killed on the job. Their tragic deaths brought to 188 the number of Caltrans workers who have been killed on the job since 1921.

At the ceremony, I was particularly moved by the appearance of Deborah Prochnow, a Caltrans Maintenance Division manager who works in our Los Angeles-based District 7. She read a poem she wrote about her harrowing experiences working along roadsides.

I want to share a short sample:

"You will stuff the brush with death way down deep.

You will get your instructions for the day put on your vest and hard hat and get back to work.

You are the unsung hero protecting people who don't see you."

When you are driving through work zones, we urge you to put away all your distractions and focus on your surroundings. Plan for delays and let's make sure we all get to where we are going safely.

Laurie Berman  
Director of Caltrans

**Cover:** What will California's transportation network look like in the future? Will we be riding in autonomous taxis, belong to an electric bicycle sharing club, using a printing process to create our vehicles of tomorrow? And how will Caltrans adapt to this new transportation world? A new report lays out some possible paths for Caltrans planners to consider. *Modified illustration courtesy of vecteezy.com.*

# Mile Markers



## Goal: Safety and Health

Provide a safe transportation system for workers and users, and promote health through active transportation and reduced pollution in communities.

Fatalities	2014	2015	Target
Auto Fatalities per 100 Million Miles	0.71	0.74	Less than 0.5
Pedestrian Fatalities	227	234*   +3.1%	204   2015
Bicycle Fatalities	16	30*   +87.5%	14   2015

\* Most recent available data

Programmed vs. Allocated Active Transportation Funds to Date*			
	Fiscal Year(s)	% of Programmed Funds Allocated <sup>‡</sup>	Target
First Call for Projects**	2014-15 & 2015-16	97%	100%
Second Call for Projects	2016-17	88%	100%
	2017-18	22% <sup>#</sup>	
Third Call for Projects	2017-18	15%	100%
	2018-19	N/A	

\* Fiscal year to date

\* Local partner projects only.

\*\* Request for applications for upcoming cycle.

‡ Comparison of originally programmed project phases and the approved project phase allocations.

# Fiscal year to date.

Other Safety and Health Markers	Previous Reporting	Most Recent	Target
Percentage of Active Transportation Projects Awarded Within Six Months	57%   2017-18, Q2	67%   2017-18, Q3	100%
Employee Work-Related Injuries/Illnesses per 200,000 Hours Worked*	5.29   2017-18, Q2	6.57   2017-18, Q3	4.5
Number of Injuries For Autos, Bicycles and Pedestrian Modes of Travel	74,490   2014	82,838   2015**	Reduce 5% Annually
Worker Fatalities in Work Zones	1   2017	0   2018	0 Per Calendar Year

\* Includes Cal/OSHA reportable and non-reportable injuries/illnesses. Incident rate represents 12 months of data for each quarter.

\*\* An average of the most recent five years of collision data up to 2013.

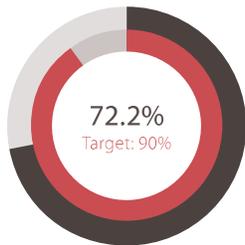
# Performance Goals



## Goal: Stewardship and Efficiency

Money counts. Responsibly manage California's transportation-related assets.

Percentage of Transportation Management System Units in Good Condition



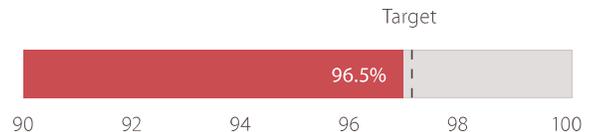
Target	90% by 2020
July-Sept. 2017	73.1%
Oct. Dec. 2017	72.2%

Planned Projects Delivered in Fiscal Year



Target	100%
2015-16	98%
2016-17	97%

Percentage of Bridge Deck Area in Good or Fair Condition

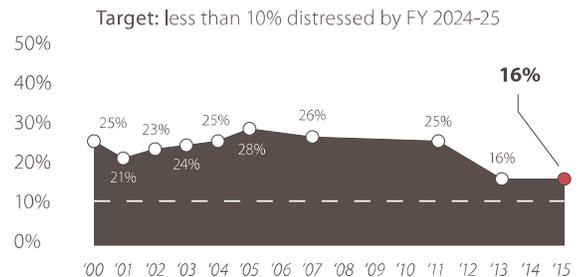


Goal Better than 97.2% rating by 2020

2015-16 97.0%

2016-17 96.5%

Pavement Health Index



Information Technology Projects	2017 18, Q2	2017 18, Q3	2020 Target
Info Advantage System Uptime	100.00%	100.00%	99%
Caltrans Network Uptime	99.63%	99.37%	99.5%
Response to Employee IT Requests Within Two Hours	39.7%	60.0%	40%

Annual Percentage of Research Projects With Implementable Solutions	2015 16	2016 17	2020 Target
Caltrans Research	50%	61%	75%
University Transportation Centers (UTC) Research	20%	28%	40%
National Cooperative Research	10%	25%	20%

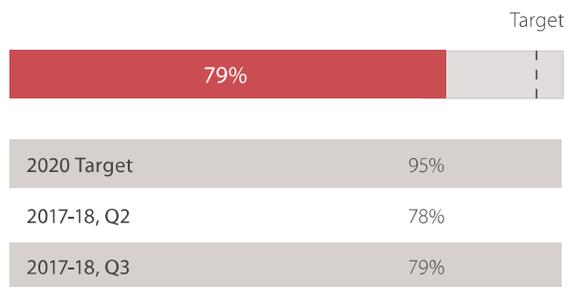
# Mile Markers



## Goal: Stewardship and Efficiency

Money counts. Responsibly manage California's transportation-related assets.

### Encroachment Permits Approved or Denied Within 30 Days



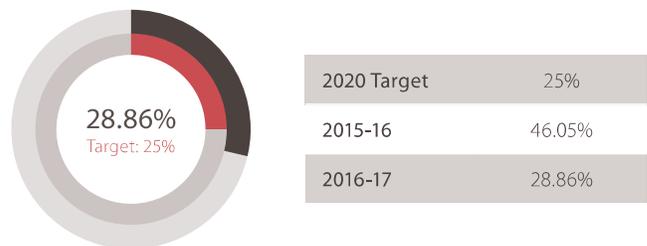
### Percentage of Online Single-Trip Permit Requests Handled in Less Than Two Hours



### Federal Funds Used in Year of Availability (Annually)



### Contract and Procurement Dollars Awarded to Small Businesses Annually



Other Stewardship and Efficiency Markers	2015 16	2016 17	2020 Target
Americans with Disabilities Act (ADA) Expenditures Programmed (Annually)	\$39.8 Million	\$40.7 Million	\$35 Million
Number of Lane Miles of State Highway System Relinquished (Through 2020)	52.85 Lane Miles	88.44 Lane Miles	150 Lane Miles
Contract and Procurement Dollars Awarded to Disabled Veteran Business Enterprises Annually	5.07%	3.30%	5%

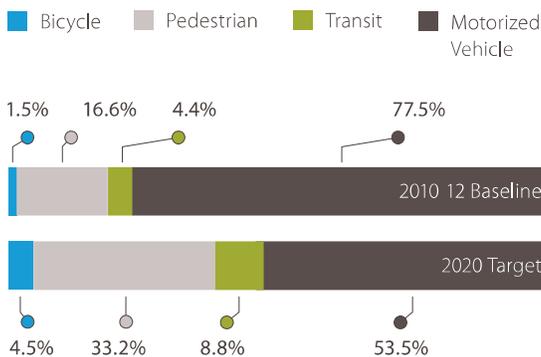
# Performance Goals



## Goal: Sustainability, Livability and Economy

Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl.

### Percentage of Trips



### Vehicle Miles Traveled Per Capita, Statewide Average

Year	Value	Change from 2010 Baseline
Target	By 2020, 15% lower than 2010 baseline	
2010 Baseline	8,779	
2015	8,701	-0.9%

### Greenhouse Gas Emissions from Caltrans Operations (in metric tons)

Year	Value	Change from 2010 Baseline
Target	By 2020, 15% lower than 2010 baseline	
2010 Baseline	217,485	
2017	118,980	-45.3%



## Goal: System Performance

Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

Complete Streets Implementation	Previous Reporting	Most Recent Reporting	Target
Percentage of Projects That Include Complete Streets Features	27%   2017-18 (through Q2)	27%   2017-18 (through Q3)	68% by 2020
Number of Complete Streets Features on State Highway System	1,862   2017-18 (through Q2)	1,853   2017-18 (through Q3)	1,613 by 2020
Percentage of Fully Implemented High-Focus Action Items From Action Plan 2.0	72%   2017-18 (through Q2)	72%   2017-18 (through Q3)	100% by 2018

Other System Performance Markers	Previous Reporting	Most Recent Reporting	2020 Target
Accurate Reporting of Traveler Information (Travel Times, Construction Activity, Incidents, and Adverse Weather)	95.33%   2017-18, Q2	95.66%   2017-18, Q3	85%
Provide Real-Time Multimodal System Information Available to the Public (Number of Corridors)	3   2017-18, Q2	3   2017-18, Q3	13
Completed Corridor Implementation Plans	4   2017-18, Q2	4   2017-18, Q3	5
Number of Corridors With Integrated Corridor Management Implementation	2   2017-18, Q2	2   2017-18, Q3	3

# Mile Markers



## Goal: System Performance

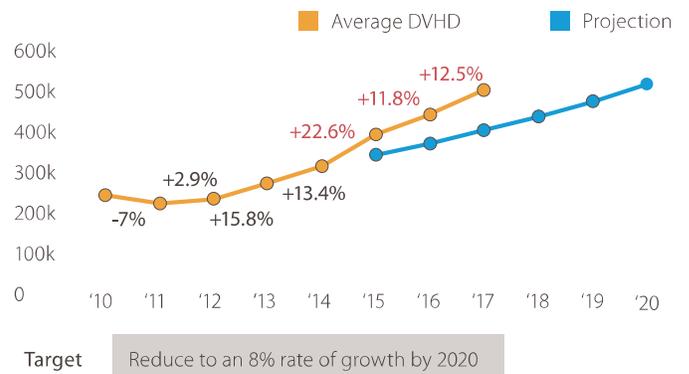
Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

### Travel Time Reliability

R Reliable    M Moderately Reliable    U Unreliable

	Baseline	2017 18 (Q2)	2017 18 (Q3)	2020 Target
Highway 57	U	U	M	
I-110	M	M	R	One-tier improvement from baseline
I-80	U	U	U	
I-210	M	U	R	

### Average Growth in Daily Vehicle Hours of Delay (DVHD) vs. Projection



Average All Stations On Time Performance for Intercity Rail	2017 18, Q2	2017 18, Q3	Target
Capitol Corridor	91.2%	88.5%	90%
Pacific Surfliner	81.7%	81.2%	90%
San Joaquin	80.8%	78.2%	90%

End Station On Time Performance for Intercity Rail	2017 18, Q2	2017 18, Q3	Target
Capitol Corridor	90.3%	88.4%	90%
Pacific Surfliner	76.0%	75.0%	90%
San Joaquin	79.3%	82.8%	90%

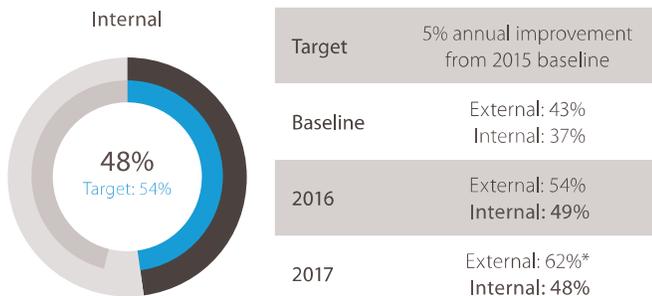
Daily Vehicle Hours of Delay (Top Three Integrated Corridors)	2017 18, Q2 (Year Over Year)	2017 18, Q3 (Year Over Year)	2017 18 Target
I-110	-3.1%	9.9%	Less Than 6% Increase Annually
I-80	40.0%	25.1%	Less Than 6% Increase Annually
I-210	14.3%	32.2%	Less Than 6% Increase Annually



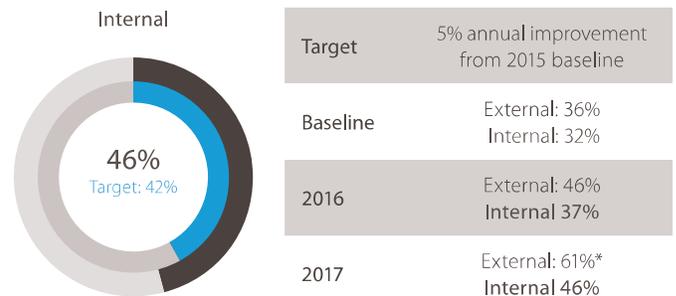
## Goal: Organizational Excellence

Be a national leader in delivering quality service through excellent employee performance, public communication and accountability.

### Stakeholders Who Gave Positive Feedback About the Mile Marker in Annual Survey

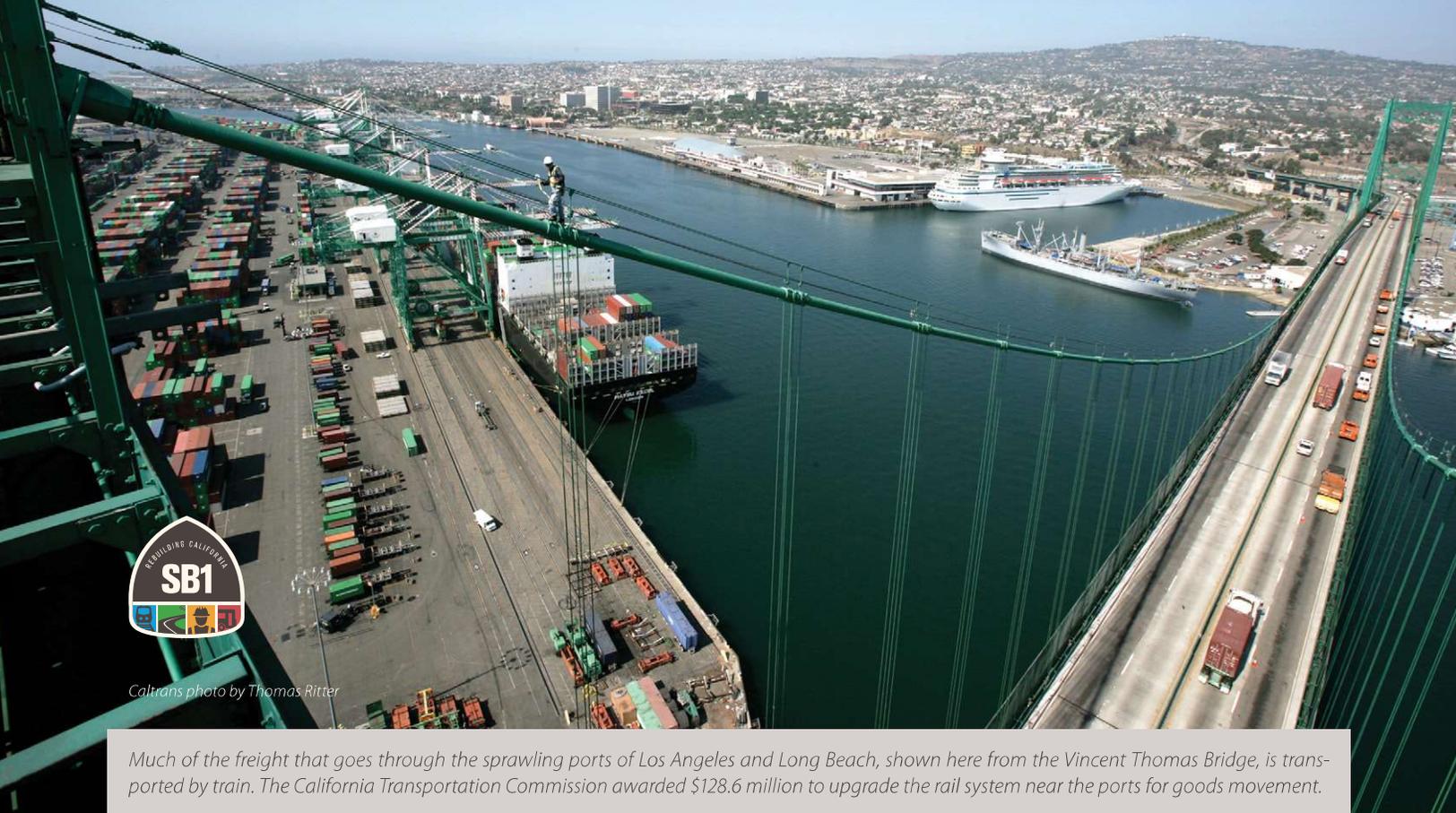


### Stakeholders Who Feel That Department Communication, Professionalism, and Service Levels Have Improved



Other Organizational Excellence Markers	2016	2017	2017 18 Target
Employees Who Indicate That They Work in a Positive Environment	57%	57%	62%
Caltrans Employees Who Agree That Employees are Encouraged to Try New Ideas	47%	49%	75%
External Survey Respondents Who Said Caltrans is Doing a Good or Excellent Job in Meeting Their Needs	61%	75%*	75%
Caltrans Employees Who Rate Caltrans Management as Open and Honest in Communications	51%	46%	56%
Mile Marker Publications Produced on Quarterly Schedule	4	4	4
Positive Responses to Ethics Questions on Employee Survey	81%	84%	86%
Increase in the Number of Partners Who Agree or Strongly Agree That Caltrans is a Collaborative Partner	50%	65%*	75%
Increase in Employees Serving on Research and Policy Committees to Further National Engagement	44	43	44
Documented LEAN 6 Sigma Process Improvements (Cumulative)	36	23	15
Number of Caltrans Employees Trained as LEAN 6 Sigma Green Belts and Black Belts	14	17	10

\* Based on 2018 External Partner Survey.



Caltrans photo by Thomas Ritter

Much of the freight that goes through the sprawling ports of Los Angeles and Long Beach, shown here from the Vincent Thomas Bridge, is transported by train. The California Transportation Commission awarded \$128.6 million to upgrade the rail system near the ports for goods movement.

# Vital Corridor Work Gets SB 1 Funding Boost

## Commission OKs \$2.4 Billion for Freight, Congestion Programs Under New Law

With more California drivers snarled in traffic congestion that wastes fuel, time and profits, and produces more smog, the California Transportation Commission funded a pair of programs aimed at whittling down those idling hours.

At their May meeting, commissioners approved \$1 billion in funding for nine projects through the Congested Corridors Program, created and funded by Road Repair and Accountability Act of 2017, or Senate Bill 1. The new law devotes \$250 million annually to projects designed to reduce traffic congestion, and this allocation was the first from SB 1 that will cover a four-year funding cycle.

The Commission also approved a total of almost \$1.4 billion for 28 projects to reduce route delays for freight-carrying trucks and trains in California as part of SB 1's 2018 Trade Corridor Enhancement Program. The program is projected to receive about \$300 million annually from SB 1 revenues.

### Congested Corridors Program

The Commission originally received 32 proposals from 15 agencies requesting more than \$2.5 billion in funding from the Congested Corridors Program. Planning for the program and development of selection criteria began last year. Here are some approved projects and estimated construction costs:

- In Los Angeles County, a new transit station to link Los Angeles International Airport with the regional transit system — total cost \$525.2 million, of which \$150 million will come from SB 1.
- In Sacramento County, HOV improvements to Interstate 5 and corridor enhancements to U.S. Highway 50 — \$872 million total, with \$125 million coming from SB 1.
- In Sonoma County, HOV lane gap closure work at Marin-Sonoma Narrows project on Highway 101 — \$121.5 million total, SB 1 share \$84 million.

Traffic congestion has increased from an average of about 250,000 hours each commute day in 2011 to

about 504,000 daily hours in 2017, Caltrans reported. (Congestion is defined as the amount of time vehicles travel at highway speeds below 35 mph.)

Altogether in 2016, California drivers spent a total of 125 million hours caught up in highway congestion, Caltrans estimated.

Caltrans charts daily hours of delay (DVHD) as part of its performance standards in its 2015-2020 Strategic Management Plan.

During the Great Recession that began about 2007, DVHD actually fell. But delays caused by traffic increased at double-digit rate as the economy improved, and that trend continued in 2017 with a 12.5 percent jump.

The increase exceeded the performance target set by Caltrans to limit DVHD growth to 8 percent annually on urban state highways.

## Trade Corridor Enhancement Program

An evaluation team of Commission and Caltrans staff recommended, and commissioners approved, \$1.4 billion in SB 1 funds for 28 projects that have a total estimated cost of more than \$4 billion. The Commission reviewed 55 proposals seeking nearly \$2 billion in SB 1 funding.

The projects, from Sacramento to San Diego, are intended to increase on-dock rail capacity, eliminate at-grade rail street crossings to prevent vehicle-train collisions, lessen impacts to surrounding communities, reduce wait times at the border, and increase rail capacity.

Some of the approved projects included:

- In Los Angeles County, relief of “choke points” on Interstate 5 and at the confluence of State Routes 57 and 60 projects estimated to cost a total of more than \$800 million to build.
- In Stanislaus County, State Route 132 West expressway project, estimated to cost about \$150 million to construct.
- Improvements along the California/Mexico border network that have a projected construction cost of more than \$372 million.

SB 1 requires that 60 percent of the funds go to projects nominated by regional transportation agencies and other local entities; the other 40 percent is earmarked for projects nominated by Caltrans.

California is the fifth-largest economy in the world, and it’s estimated that the ports of Los Angeles and Long Beach combined handle 35 percent of all waterborne cargo in the U.S. The number of containers processed

Traffic congestion has increased from an average of about 250,000 hours each commute day in 2011 to about 504,000 daily hours in 2017, Caltrans reported.

through those ports increased from 5.7 million in 1996 to 15.5 million in 2016, according to the Legislative Analyst’s Office.

From that port complex, most of the arriving goods are shipped by trucks and rail. Many rail cars travel the Alameda Corridor, a 20-mile-long cargo line that connects the two ports to the transcontinental rail network near downtown Los Angeles.

Seven of the nation’s top 65 truck bottlenecks are in California, according to American Transportation Research Institute. Three Southern California pinch points — at State Routes 60 and 57, Interstates 710 and 105 and Interstates 10 and 15 — fall within the top 27.

The industry projected that congestion will cost the trucking industry \$63.4 billion in 2018 just from lost hours. That is the equivalent of 362,000 truck drivers sitting still for a year. **MM**

Source: *California Transportation Commission*



Caltrans photo by Steve Devorkin

Some Southern California highways see a heavy proportion of trucks carrying freight containers picked up at L.A. and Long Beach ports.



Caltrans photo by Sergio Ruiz

A greater percentage of people commute by bicycle in San Francisco and the Bay Area than California as a whole, and a new plan from Caltrans lays out and ranks proposed projects that could boost those numbers. Caltrans seeks to triple bicycling rates in the state by 2020 from 2010 levels.

## Plan Lays Paths for Bay Area Bicycling Growth

### Caltrans District Considers Challenges, Priorities for its Already-Popular Network

Caltrans has identified dozens of potential projects in the nine-county San Francisco Bay Area to encourage bicycling and meet state ridership goals. A plan prepared by Caltrans region District 4 builds on the [“Toward an Active California”](#) statewide report released last year, a blueprint to triple the amount of bicycling and double rates of walking and transit use in California by 2020 from 2010 levels.

Caltrans staff and consultants identified existing bicycle networks in the Bay Area, and then worked to prioritize specific projects that could be undertaken in-house or in collaboration with other public agencies in District 4. With nearly 1,400 miles of state highways in the Bay Area, Caltrans plays an important role in connecting and expanding the regional transit network.

The proposed improvements range from simple striping or signage on existing facilities to more extensive enhancements, such as new trails, bike lanes or highway crossings. Priorities were arranged according to demand, cost, amount of local support, whether a community

considered disadvantaged was involved, and quality of existing services.

The report lists projects ranked in the top tier of importance in each of the nine counties, each with an estimated cost of least \$250,000 and reaching over \$7 million in some cases. They include:

- The Napa Valley Vine Trail, a planned 47-mile walking and biking network from the Vallejo Ferry Terminal to Calistoga along State Route 29.
- The Lincoln Hill Pathway, part of Marin County’s planned North-South Greenway, a 25-mile bicycle and pedestrian corridor that parallels US 101 from the Golden Gate Bridge to Novato.
- A bicycle path along the San Francisco–Oakland Bay Bridge West Span between Yerba Buena Island and downtown San Francisco.
- Currently under construction, the US 101 bicycle and pedestrian overcrossing in East Palo Alto will connect communities on each side of the busy freeway.

In District 4, the percentage of commuters using bicycles is about 1.8 percent, slightly more than the 1.5

percent for California as a whole, according to the U.S. Census Bureau's American Community Survey. In some sections of the Bay Area, such as San Francisco, the percentage of bicycle commuters is 2 percent or more, according to the District 4 report.

This snapshot of bicycling usage aligns with provisions in [Caltrans' 2015-2020 Strategic Management Plan](#) that champion more biking and walking as ways to preserve the environment, improve public health and promote a healthy lifestyle, increase transportation opportunities, and support efficient land use.

The report estimates that it would take several billion dollars to fully upgrade bicycle infrastructure in the Bay Area. Existing funding sources such as the State Highway Operation and Protection Program (SHOPP), the Active Transportation Program that encourages sustainable ways of travel, and the State Transportation Improvement Program (STIP) are available for projects, the report said. Money may also come from the Road Repair and Accountability Act of 2017 (Senate Bill 1).

Caltrans conducted extensive outreach in preparing the District 4 plan. A technical advisory committee of representatives from agencies, cities and advocacy groups from all nine Bay Area counties provided guidance.

In addition, input was received from almost 3,500 people who responded to an online survey, six focus groups were convened across the Bay Area, and a webinar

In some sections of the Bay Area, such as San Francisco, the percentage of bicycle commuters is 2 percent or more, according to the District 4 report.

was held as part of the outreach.

Going forward, the plan will help guide investments by Caltrans and other jurisdictions. Officials in District 4 will, among other steps:

- Continue to track bicycle-related investments in the Bay Area;
- Advise local agency partners on improvement projects;
- Explore opportunities to partner with local agencies on pilot projects and events promoting bicycling;
- Strengthen engagement with low-income, minority, rural and tribal communities during planning and project development to ensure their mobility needs are met.
- Work with local agency partners and stakeholders to make a transportation network that prioritizes safety. **MM**

Source: Caltrans District 4 Bike Plan



Caltrans conducted extensive outreach as it prepared a new bike plan for the nine-county Bay Area. Officials conducted a survey, created a technical advisory committee and met with representatives of community and advocacy groups. This tour showed off separated bikeways in San Francisco.

# Master Plans to Improve Roads Approved

## SB 1 Funding Key as State Commission Adds Nearly 1,000 Projects to Priority List

Caltrans has added nearly 1,000 projects to its fix-it list for needed state highway repairs, funded in large part by revenue from the Road Repair and Accountability Act of 2017 (Senate Bill 1).

The California Transportation Commission (CTC) approved the [2018 State Highway Operations and Protection Program](#) (SHOPP) worth \$18 billion, an increase of more than \$7 billion from the 2016 SHOPP.

The SHOPP, which is updated every two years, funds the repair and preservation of the state highway system, safety upgrades, emergency repairs, and some highway operational improvements over a five-year period.

The 2018 SHOPP covers work planned in fiscal years 2018-2019 through 2021-2022. The new projects have been added to the list of thousands of other state and local projects already planned, under construction or completed statewide under the first five-year SHOPP funding cycle adopted in 2016.

The SHOPP, funded by federal and state sources, will for the first time see significant revenue inflows from SB 1 that raised California fuel taxes and vehicle registration fees. Caltrans has committed to repairing and rehabilitating the State Highway System under the new law, which also created an independent Inspector General and gave additional oversight powers to the CTC to monitor SB 1 spending and programs.

The CTC adopted the 2018 SHOPP and the [State Transportation Improvement Program](#) (STIP) at its March meeting in Orange County. The STIP is dedicated to improving highway, intercity rail and transit systems in California, including projects that add transportation capacity. Approximately 75 percent of STIP funds go to local and regional agencies, while the remaining 25 percent finances interregional projects that improve highways.

The 2018 STIP contains \$3.28 billion for projects over the next five years. As with the SHOPP that funds highway maintenance and repair, the STIP has been replenished by SB 1 revenues. More than \$2 billion of the STIP is newly available money.



*On US 101 in Del Norte County, crews perform repairs on the highway at what's known as Last Chance Grade south of Crescent City.*

**SB 1 provides an ongoing funding increase of approximately \$1.8 billion annually for the maintenance and rehabilitation of the State Highway System.**

Prior to the passage of SB 1 in 2017, the CTC had to cut and delay \$1.5 billion in already planned projects from the 2016 STIP due to a steady loss of gas tax revenue. With new funds from SB 1, Caltrans is now reversing a long period of deterioration and decay on state roadways.

SB 1 provides an ongoing funding increase of approximately \$1.8 billion annually for the maintenance and rehabilitation of the State Highway System. With the money, Caltrans has pledged to fix more than 17,000 lane miles of pavement, 500 bridges and 55,000 culverts by 2027. Caltrans also will repair or replace 7,700 traffic operating systems vital to highway operations. **MM**

*Sources: Public information officers Angela DaPrato and Vanessa Wiseman, Caltrans HQ*



*Job fairs such as this one on April 6 in Marysville that attracted about 500 people is one way Caltrans seeks to replace retiring workers and prepare for an expanded workload from SB 1. Caltrans is hosting 10 of these events in 2018. For every five people hired by Caltrans in 2017, four retired.*

## Caltrans Building Up its Workforce

### Recruiting Efforts Stepped Up to Meet SB 1 Demands, Offset Attrition

**G**rapplying with an ongoing wave of retirements and increased demand for workers as a result of the Road Repair and Accountability Act of 2017 (Senate Bill 1), Caltrans is expanding efforts to recruit, train and retain employees.

Caltrans is staging more job recruitment events, ramping up outreach via social media and other means, creating more opportunities for existing employees to move up or transfer their knowledge in the Department, streamlining the job application process, and boosting mentoring and student assistant programs. These measures align with Caltrans' 2015-2020 Strategic Management Plan objectives for succession planning within the organization.

The overall workforce strategy is important because Caltrans values and seeks diversity, and realizes the importance of placing the right number of people with the right skills in jobs suited for them. And that's a challenge with more than 18,500 full-time, permanent employees spread out across the state.

Caltrans estimates that it needs to hire several thousand workers in the coming years. There were 1,383

people hired in fiscal year 2016-17 and 1,590 through March of fiscal year 2017-18. That hiring helped offset the number of people leaving Caltrans during those same periods, 877 in 2016-17 and 1,023 in 2017-18.

Surveyors, environmental planners, heavy equipment operators, and electricians are proving particularly difficult to recruit. Project designers, engineers, planners and maintenance workers in general also are being sought.

To replenish its ranks, Caltrans in 2017 began hosting career fairs where attendees got help navigating the state application process, then met with hiring managers of various divisions.

Between 600 and 1,000 people attended each event last year. They were so successful that Caltrans is hosting 10 of them in 2018.

It's part of an ambitious effort to address the current tide of retirements, and those expected over the next five years. About 54 percent of the Caltrans workforce is age 50 or older. Of those workers, nearly 67 percent are managers and supervisors.

Compared with Caltrans, the State workforce skews considerably younger. Statistics show that 38.5 percent of State workers are age 50 and above.

Millennials — those persons born roughly between 1982 and 1997, with the oldest being 36 — make up just 14.5 percent of Caltrans' employees. In contrast, about 37 percent of the U.S. workforce and 23.1 percent of all State workers are in the millennial age bracket.

SB 1, projected to provide Caltrans about \$1.8 billion annually for transportation system repairs and improvements, will add to the workload in the coming years. When SB 1 was signed by Gov. Edmund G. Brown Jr. in May 2017, Caltrans was at its lowest level of staffing in a decade.

Caltrans also is making a strong effort to retain the institutional knowledge of its experienced staff before they retire. The Department is updating a ["Knowledge Transfer Guidebook"](#) that outlines ways to help with

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succession planning within the organization. Those include cross-training, job shadowing and job rotations.

Already, the wave of retirements is cresting. For every five employees hired, four are retiring, according to Caltrans statistics. Bearing out that trend, more than 700 people retired from the Department in 2017. **MM**

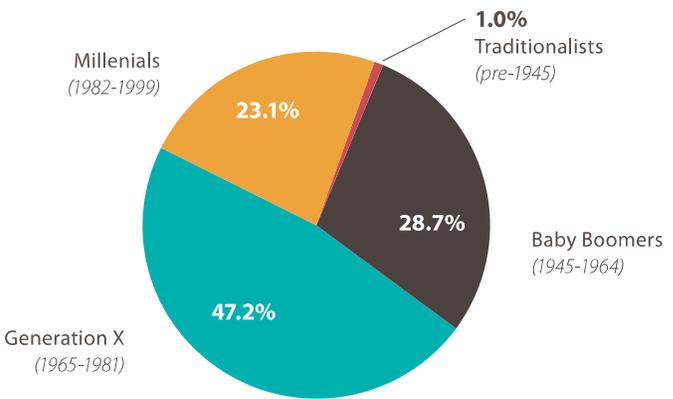
*Sources: Jason Solis, Caltrans Office Chief, Workforce Planning, Recruitment, and Employee Engagement; Christina Hisamoto, Recruitment Manager; Harriet Simpson, Workforce Planning and Employee Recognition Program*



*Caltrans photo by Scott Lorenzo*

*Encouraging students such as Lewis Duah to become student assistants or volunteers at Caltrans is an effective recruiting tool.*

### State of California Workforce by Generation



*Caltrans photo by Scott Lorenzo*

*Jay Saefong gains valuable work experience, and Caltrans gains access to talented recruits through a student assistant program.*



Caltrans photo by Lee Drake

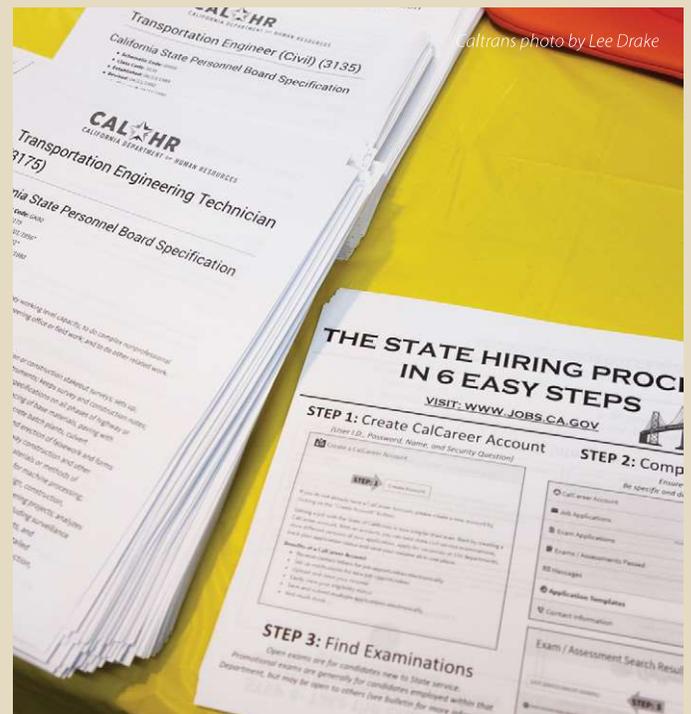
Job fairs such as this one in Marysville are an effective way to recruit employees, but Caltrans, trying to cope with a surge in retirements and new work from SB 1, is going beyond by streamlining the hiring process and participating in a pilot project using professional networking site LinkedIn.

## Recruiters Widen Approach to Find, Keep Workers

Caltrans has launched a series of recruitment efforts to bolster its workforce. They include:

- More than doubling the number of recruitment events attended by Caltrans representatives, from 30 to 65 last year. Those included job fairs at universities, and partnering with county probation officers, refugee centers and other agencies.
- A pilot project using the LinkedIn professional networking site to recruit for candidates with specialized skills. The state Department of Public Health, Department of General Services, and Department of State Hospitals also are participating.
- A collaboration with the California Department of Human Resources to consolidate outdated classifications, which reduces the number of exams that job candidates must take. The State's Department of Technology underwent the first consolidation, with the number of classifications dropping from 36 to nine, affecting about 10,000 workers. It's hoped the modernized system will benefit workers already in civil service IT positions, and the State, which will be in better position to attract and keep employees with vital technical skills.
- Greater participation in student assistant and volunteer programs. For example, the number of student assistants working at Caltrans has tripled over the last three years.
- Visiting college campuses and interviewing job candidates on the spot. Three such events were recently held at California State University in Fresno and Sacramento, and Cal Poly, Pomona. There were 490 applicants in total. As of June 5, 157 conditional job offers were extended, with more likely.

- Expanding Caltrans' mentorship programs. Started in 2015, about 500 people have participated to date. The goal is to expand employee skill sets and provide opportunities that could lead to advancement.
- Ongoing promotion of job fairs and other events through social media and other means.
- Participating in job fairs and other programs offered by local governments in places such as the San Francisco Bay Area, where the high cost of living makes it more difficult to recruit some positions.



Caltrans photo by Lee Drake

Efforts are being made to demystify the state hiring process that can be confusing for those unfamiliar with civil service requirements.



Photo courtesy of Elkhorn Slough Foundation staff

Mark Silberstein, executive director of the Elkhorn Slough Foundation, and former Caltrans biologist Carrie Swanberg walk through the maritime chaparral of the Elkhorn Slough Reserve, property that Caltrans bought to mitigate construction on Highway 101 and donated to the foundation.

# Partnerships Preserve Unique Habitat

## Land Donation, Restoration Offsets Highway Work in Monterey, San Diego Area

In one of the first transactions of its kind for Caltrans, a unique and environmentally sensitive swath of coastal habitat in Monterey County has been handed over to a nonprofit environmental foundation to fulfill offsite mitigation requirements for a Highway 101 construction project.

In this case, Caltrans bought 167 acres and later transferred the property to the Elkhorn Slough Foundation, along with an endowment to manage the land. The property was acquired in 2008 when Caltrans was preparing to make major improvements to the US 101 Prunedale corridor. The stretch was made safer by eliminating left-turn traffic, and building interchanges and an overpass. The project was completed in 2014.

The property known as the Elkhorn Highlands Reserve consists mostly of maritime chaparral habitat, along with freshwater wetlands and oak woodlands. It is home to the endangered California Tiger Salamander and a variety of other species of animals and rare plants, including endangered Yadon's piperia and threatened Monterey spineflower.

The reserve connects adjoining parcels in the Elkhorn Slough watershed that extends seven miles inland and occupies about 80 square miles in northern Monterey County. The watershed includes the largest tract of tidal

### Elkhorn Slough Mitigation Site



The project also will restore or enhance six lagoons in the (San Diego) area, which are some of the most significant remaining coastal lagoons in Southern California.

marsh in California outside of San Francisco Bay, and is habitat for more than 340 bird species.

The arrangement with the foundation was made possible by Senate Bills 436 and 1094 passed in the 2011-2012 legislative session that allow state and local agencies to transfer funds to nonprofit organizations, special districts or land trusts for endowing and managing land acquired to offset impacts of a development project.

The legislation allowed Caltrans to transfer the land, along with a \$2 million endowment. The entire deal was worth about \$6.5 million, and was one of the first under SB 436 and SB 1094.

The transfer could serve as a model for similar partnerships in the future.

In another type of partnership at the state's south end, Caltrans is working with San Diego Association of Governments to create several hundred acres of

preserved coastal habitat, and preserve and restore valuable lagoons.

The work is part of the I-5 North Coast Corridor Program, an ambitious makeover of the rail system and portions of Interstate 5 between Oceanside and Solana Beach. The project also will restore or enhance six lagoons in the area, which are some of the most significant remaining coastal lagoons in Southern California.

At San Elijo Lagoon, for example, a contractor is pumping sand to nearby beaches, clearing vegetation, and building a series of dikes along the main lagoon channel and inlet to control water elevations and turbidity. San Elijo is expected to be fully restored in early 2021. The wetland habitat will feature walking trails around the lagoon.

Both the Elkhorn Slough and I-5 North Coast Corridor Project align with sustainability goals outlined in Caltrans' 2015-2020 Strategic Management Plan. The plan notes that Caltrans will focus on transportation impacts affecting people, planet and prosperity. ■

*Sources: Elkhorn Slough Foundation; Nancy Siepel, Mitigation and Wildlife Connectivity Specialist, Caltrans District 5; Caltrans District 11 Small Business Update; and Hayden Manning, public information officer.*



*Caltrans photos provided by District 11*

*The sand on the left was recently dredged from San Elijo Lagoon and is replenishing existing sand at Cardiff State Beach (photo at right).*



*A bulldozer moves recently pumped sand onto Cardiff State Beach as part of a lagoon restoration project in the San Diego area.*

# The Transformation of Transportation

Study Looks at How We'll Get From Here to There as Caltrans Plans for Future

New technology, evolving economic and societal directions, and a changing climate are creating a seismic shift in the way California moves people and goods — and that makes transportation planning particularly challenging.

A new study commissioned by Caltrans suggests that the field of transportation is in the midst of a transformation not experienced since the invention of the automobile.

There are many intriguing possibilities and trends emerging, according to the Future of Mobility White Paper, which is intended to inform Caltrans planners who will lay the groundwork for California's transportation network into 2050.

"The rapid changes in the transportation industry will dramatically alter California's transportation system and affect the way Caltrans operates," said Chris Schmidt, Caltrans' Division Chief of Transportation Planning. "The Department will have to develop and implement realistic policies while taking into account rapidly changing technological advancements, many of which continue to evolve and new ones emerge."

The revolution in moving people and goods has already arrived. In just the last five years, ride-sourcing companies such as Uber and Lyft, car-sharing services like Getaround and car2go, and bike-sharing businesses such as Spin and Ford GoBike have expanded market share. Autonomous vehicles are a reality, drones and self-driving trucks could shake up the goods-moving industry, and technologies considered unthinkable a decade ago — such as hyperloop and air taxis — are no longer just science fiction imagination.

Not only are modes of transportation changing, but major advancements have been made in vehicle safety technology. The refinement of on-board cameras, radar and sensors have led to the development of accident avoidance systems that warn of possible collisions, lane departures or oncoming pedestrians, as well as advanced braking assistance and adaptive cruise control.



*Many cities have embraced the shared car concept, establishing zones where short-term rentals can be picked up and dropped off.*

The transformative changes described in the white paper study will be considered as Caltrans begins preparing its California Transportation Plan 2050, a long-range look at state transportation trends. State law requires Caltrans to update its transportation plan every five years, and the next one is due in 2020.

For the white paper study, a Caltrans team worked for about a year with the Transportation Sustainability Research Center at UC Berkeley.

According to the white paper, here are some key transportation trends that could affect Caltrans' planning decisions in the future:

## Car Sharing

The U.S. car sharing market in the U.S. has become a **\$23 billion industry**, and in 2016, Northern California was home to two million car-sharing members. That number is expected to grow.

On average, car-sharing members reduced the amount of vehicle miles traveled by 27 percent.

In a study analyzing the impact of car2go, the company claims that **each car2go vehicle removed seven to 10 privately owned vehicles** from city streets, a result of vehicles sold or purchases avoided. Forty-six percent of peer-to-peer members (who rent out privately-owned vehicles) said they did not have a car before joining, and 20 percent said they were driving less.

Vehicles in car-sharing programs were **in use 12 percent to 15 percent** of the time — far more than the 4 percent rate of privately owned vehicles.

## Bike Sharing

Ridership and development of bike sharing programs have grown steadily in the U.S. since the first one debuted in 2010. Today, **171 programs operate in the country**, and 60 cities run public programs.

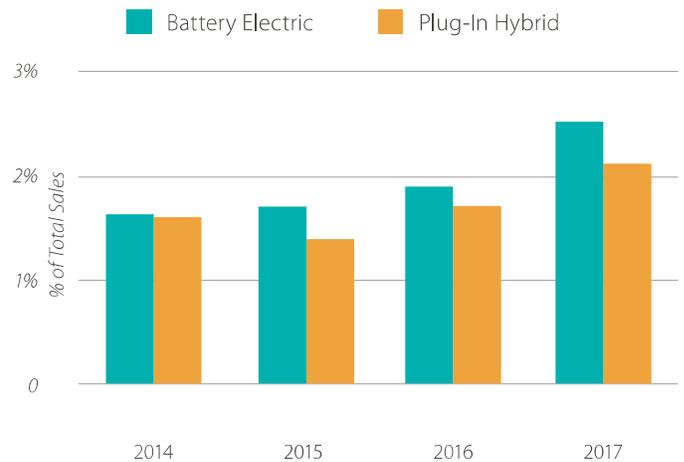
Bike sharing can be incorporated into existing transportation systems. For example, **bike stations** can be established in public transit hubs, and payment systems can be integrated.

More than 8,100 shared bicycles are in use in Northern California; about 4,700 in Southern California.



Bike sharing has expanded quickly, with about 28 million users nationally as of 2016. Almost 14,000 shared bikes are in use in California.

## Zero-Emission Vehicle Market Share in California



Source: IHS Markit

## Ride Sourcing/Transport Network Companies\*

Ride-sourcing services have expanded rapidly since their introduction in San Francisco in summer 2012. In California, **Uber operates in more than 172 urban areas; Lyft serves 92 cities.**

More than one-third of respondents in three reviewed studies said they would have taken public transit, biked or walked had services such as Uber and Lyft not been available.

In San Francisco, this type of service was responsible for about **20 percent of intra-city vehicle miles traveled** in 2016.

\* The report contends that more research is needed to document the impacts on ownership rates from ride sourcing, car sharing and bike sharing.

## Alternative Transit Services

Micro transit, which is usually a privately operated transit system, is starting to emerge as a **way to fill gaps in public transit networks**. In October 2017, Los Angeles Metropolitan Transit Authority released a request for proposals, and a private company has said it will launch similar service in Orange and Contra Costa counties and in the San Joaquin Valley in 2018 through partnerships with local transit agencies.

Earlier attempts at micro transit service struggled due to financial constraints and low ridership.

## Connected and Autonomous Vehicles

As of May 2018, **54 manufacturers had autonomous vehicle test permits**, according to the California Department of Motor Vehicles. A permit allows manufacturers to test on all public roadways in California. They don't need a permit to test on private roads.

In April 2018, companies could start testing vehicles on city streets with no one at the wheel. Currently, the DMV is reviewing two driverless testing applications — **no permits have been issued as of June 8, 2018.**

According to various studies, autonomous vehicles could make up anywhere from 20 percent to 95 percent of miles traveled on U.S. roads by 2030. By some estimates, autonomous ride-sharing services could be a **\$750 billion industry by 2030.** Although Uber temporarily stopped autonomous vehicle testing after a pedestrian was struck and killed in March, Waymo recently announced that it plans to buy and convert 20,000 Jaguar Land Rover vehicles to be part of an autonomous ride services fleet by 2020.

## Zero-Emission Vehicles (ZEV)

Sales of electric vehicles have climbed since 2013. In 2015, 172,895 ZEVs were registered in California — a 45 percent hike in one year. The totals jumped to 263,248 in 2016 and 337,483 in 2017.

But California has a significant **charging infrastructure gap.** The 2016 Zero Emission Vehicle Action Plan calls for the installation of one million charging stations by 2020.

## Shared Mobility Public Private Partnerships

In these partnerships, a **public entity and a private provider team up** to operate a transportation service. Public agencies are using them to reduce costs, and expand or improve service. *There are four main types:*

1. Providing first-and-last mile service to public transit, such as from a person's home to the train station. This is a key element in helping create a seamless transportation network in the future, according to Caltrans' draft 2018 California Rail Plan;
2. Filling gaps in existing service;
3. Serving disadvantaged populations;
4. Other mobility services

## Rail Service

According to the draft state Rail Plan, California's rail network could have the capacity by 2040 to accommodate **1.3 million daily trips.** The system today averages about 115,000 daily trips.

**Rail lines** in many parts of the state are scheduled to be **electrified** using renewable energy.

Integrated service is needed to **coordinate time schedules, payments, and transfers** between public and private transit providers.

Planning and initial construction of a **high-speed rail system** in California is continuing, which would offer a competitive option to driving or air travel.

## Freight and Goods Movement

**Electrification and automation** are predicted to drop per ton-mile trucking costs from 12 cents to 3 cents. Automation could boost industry revenue an estimated \$100 billion.

The adoption of **ZEVs in the freight industry** is expected to bring a 4 percent reduction in greenhouse gas emissions, and a 3 percent decline in nitrous oxide emissions.

**On-demand trucking services**, which connect trucks and shippers, may help cut costs that shippers and truckers pay to brokers.

**Truck platooning** is expected to become more common, especially at ports. Platooning consists of several trucks equipped with state-of-the-art driving support systems following each other. It is intended to improve safety, lower emissions and cut fuel costs.

Automation will likely **displace drivers and port workers**, and will be met with some resistance.

Transporting freight via the ocean routes could increase. Use of "**marine corridors**" is being studied, though it could be too slow for time-sensitive deliveries. This would emit fewer greenhouse gas emissions and could ease congestion on freeways.

California state agencies are collaborating on freight pilot projects to accelerate the transition to a **zero-emission freight system.**

## Cyber Security Risks

About **23 million vehicles worldwide are connected to the Internet**, and at least one study predicts 20 percent of all vehicles will have some form of wireless network connection by 2020.

**Researchers are worried about hackers.** In 2015, two computer programmers hacked into a *Wired* magazine reporter's vehicle and disabled the transmission, forcing the driver to the side of the road and prompting an automotive recall.

## Drones

Some companies have used drones to deliver packages. However, **widespread use may be limited** due to their (currently) small carrying capacity and governmental regulations.

It is estimated that about 20 drone trips are needed to replace one conventional delivery van trip.

## On the Horizon

**Blockchain technology:** The underlying structure behind cryptocurrencies such as Bitcoin, blockchain is a decentralized ledger that enables financial transactions and "smart contracts" — and some experts say it could be a boost in mobility-service transactions, such as peer-to-peer car rentals.

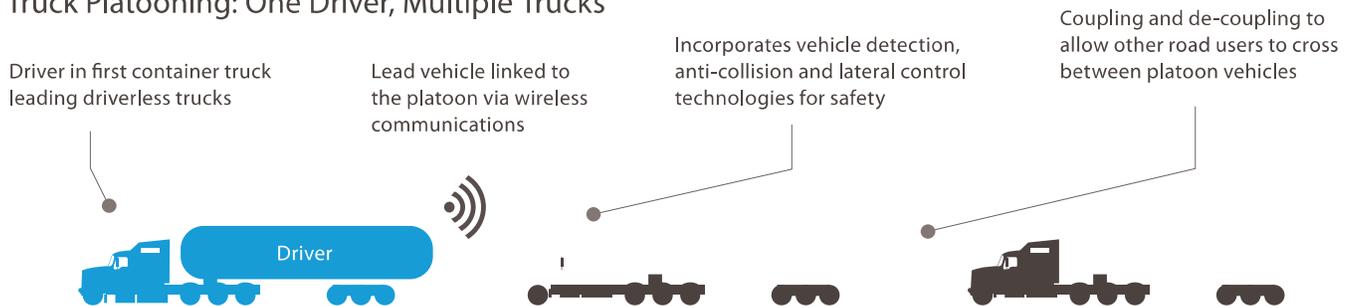
**3D Printing:** This "additive manufacturing" shortens supply chains since goods are made closer to the consumer, lessening the need for freight travel. Some companies are already making vehicles with 3D-printed materials.

**Hyperloop:** This high-speed technology, estimated to cost \$60 million per mile to build, uses magnets to carry pods in a vacuum tube, and is being eyed as a way to transport freight (and possibly people at some point). Routes are under consideration in California.

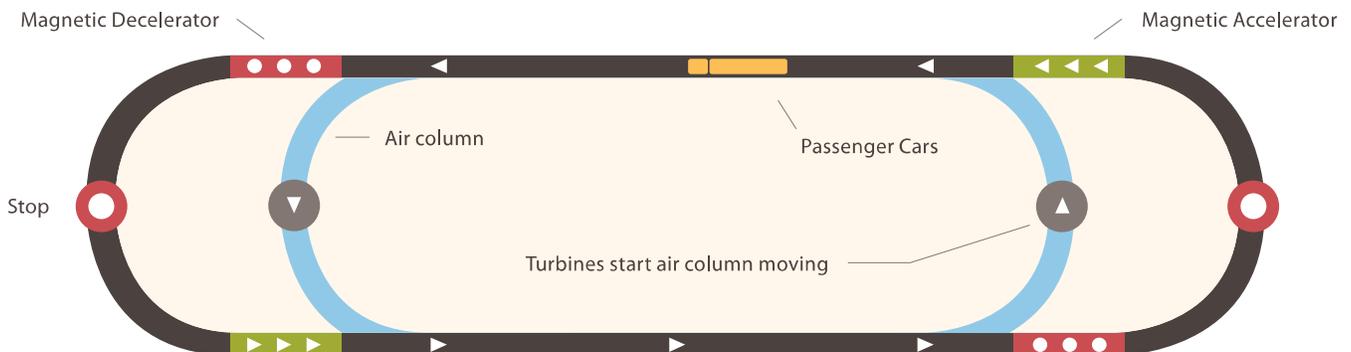
In conclusion, the report acknowledges that it's impossible to predict what the transportation network will look like in 2050, but that it's critical that policymakers consider the range of technologies and services that could transform how people and goods travel in the state. **MM**

Source: "Future of Mobility" white paper; Caltrans Office of State Planning; Next 10; California Department of Motor Vehicles

## Truck Platooning: One Driver, Multiple Trucks



## Hyperloop: Travel up to 600 MPH



# Congested HOV Lanes Becoming Common

## Caltrans Report Finds Two-Thirds of State Network Fails Standard for Traffic Flow

One of Caltrans' strategies for battling highway congestion and reducing air pollution, high-occupancy vehicle (HOV) lanes are steadily losing their effectiveness as more drivers — eligible and not — crowd into them.

A Caltrans report to the Legislature details how much of Caltrans' network of HOV lanes have become as congested as mixed-use lanes.

Federal and state laws permit certain classes of vehicles to use HOV lanes without meeting occupancy requirements. Zero-emission vehicles and certain low-emission vehicles can access the lanes if they have a decal issued by the Department of Motor Vehicles. Certain HOV lanes around the state also may admit toll-paying vehicles. States must monitor and report on the performance of the HOV lanes that are open to vehicles not meeting occupancy requirements.

Caltrans maintains 1,765 HOV lane-miles in the state's more urbanized areas. The annual HOV report used traffic data such as speeds and vehicle volumes measured along many of those corridors to determine whether conditions met a standard defined as "degraded" — an average of 45 mph or less on peak hour weekdays, or a percentage of slowdowns in a given period.

Not surprisingly, the report concluded about two-thirds of the HOV lanes statewide monitored in 2016 had fallen into degraded status. About 1,322 lane-miles of the state HOV system (about 75 percent) were surveyed, covering two reporting periods in 2016.

The 2016 results continued a recent pattern of increasing congestion along the once easier-flowing HOV lanes. In 2015, HOV lane degradation was 65.5 percent, up from 61 percent in 2014.

It's clear that HOV lane traffic demand is exceeding capacity, the report says. Contributing to the lane degradation are traffic incidents, motorists not carrying the required number of riders or driving uncertified vehicles, lane change conflicts, or gaps in regional HOV lane networks.



*Interstate 580 near Livermore is part of the Bay Area's HOV network. This photo must have been taken during off-commute hours.*

Caltrans could adopt mitigation measures to improve traffic flow in HOV lanes, the report said. Possible actions could include raising vehicle occupancy requirements, adding more HOV lanes, or varying toll fees to reduce use, to name a few options.

California's HOV lanes were initially considered an innovative strategy when a bus-only lane was set up during the reconstruction of the San Francisco-Oakland Bay Bridge in 1962. Caltrans and its regional partners have expanded the statewide HOV system from 260 lane-miles in 1990 to 1,765 lane-miles as of 2016.

HOV lanes are open to vehicles that meet the minimum occupancy requirements (usually two people), transit buses and motorcycles. Some HOV lanes operate 24 hours a day, seven days a week. Others only limit access during morning and afternoon peak periods and allow use by all vehicles outside of those hours. Certain HOV lanes may be striped to allow access only at designated locations, while others allow access at any point. **MM**

Source: 2016 California HOV Degradation Report



## Employees Help Caltrans Minimize Risk

### New Online Portal Allows Reporting of Perceived Threats to Department

The world around us is in a constant state of change, and often those changes can affect the way Caltrans fulfills its mission. Caltrans has launched an online portal for employees to report observed changes that they perceive as a threat to the organization and its mission, or to suggest ways to adopt an innovative new technology tool or business practice to streamline our operations.

With more than 18,500 employees spread throughout the state, Caltrans managers realized they can enlist a lot of ground-level help to keep an eye out for things that may be amiss.

The new program works like this: Employees who visit the site are asked to describe the potential organizational risk, what drew their attention to the situation, and leave their contact information. Facilitators who monitor the site — there are three — follow up with employees to craft appropriate courses of action.

The portal debuted in March. Employees have reported a diverse set of risks so far, including pay parity, online exams, homeless encampments and ergonomics.

Employees have reported a diverse set of risks so far, including pay parity, online exams, homeless encampments and ergonomics.

By identifying and responding to organizational risks quickly, Caltrans can put controls in place to minimize the likelihood of a new risk disrupting operations, or leverage a new business practice that improves efficiency, saves money and enhances employee engagement. The program aligns with Caltrans' 2015-2020 Strategic Management Plan goal of achieving organizational excellence.

This portal is not intended to report ethics-related issues. Caltrans has a special help line to respond to those inquiries. **MM**

Source: Nate Lyday, Caltrans Enterprise Risk Management Program Manager



Caltrans photos by District 2

The east end of the 3.3-mile project to improve State Route 36 that leads to Lassen Volcanic National Park is shown as the highway was being readied for a new, straighter alignment. The Lassen Lodge Safety Realignment Project was completed in 121 days, in time for summer visitors to the park.

## Fewer Twists and Turns on Trips to Lassen Project Makes SR 36 Safer for Volcanic Park Visitors and Nevada-Bound Truckers

Some had their doubts that realigning 3.3 miles of twisting, busy highway between Red Bluff and Lassen Volcanic National Park could be done in one construction season. But the Lassen Lodge Safety Realignment Project was delivered ahead of schedule, with minimal impact on travelers and using construction methods that protected and preserved natural resources.

The stretch of State Route 36 is traveled by more than 500,000 outdoor enthusiasts who annually visit Lassen to enjoy its natural beauty and fascinating geological history. The realignment project addressed safety issues and improved the roadway for inter-regional freight movement between the Sacramento Valley and northern Nevada.

Caltrans District 2 and contractor Tullis Inc. rebuilt the section of SR 36 in Tehama County near the community of Mineral. The Lassen Lodge project began in May 2017 and was completed that November, before the end of the construction season when weather typically closes in on the area. Construction took only 121 days, considered quite a

feat since 200,000 cubic yards of rock and soil were moved.

The project was designed to reduce the frequency and severity of accidents by straightening some of its curvy features and strengthening the roadbed. The total accident rate along this stretch of highway was more than three times higher than the statewide average for similar routes. This three-mile-plus segment of roadway consisted of a series of tight curves with designated speeds as low as 20 mph.

The project features an alignment that now meets current federal large truck design standards (although the California Legal Truck length designation will not change until several other issues are addressed along the corridor).

The improved roadway geometrics, and wider shoulders (four feet to eight feet) increase sight distance and provide a larger recovery area for motorists. Other project benefits include increased sun exposure to help melt snow and ice, improved culverts and drainage facilities, and new guardrail.

It's also anticipated that the wider, consistent

## Project Spotlight



Looking east from the newly repaved SR 36 at the summit of Lassen Lodge. The historic route continues to Highway 395 near Susanville.

The project was designed to reduce the frequency and severity of accidents by straightening some of its curvy features and strengthening the roadbed.

shoulder widths and snow/rockfall catchment areas will enhance safety for Caltrans maintenance crews while reducing disruptions to travelers.

The construction incorporated important sustainability elements. Native materials were used to reduce potential erosion and improve overall stability of the embankments in the steep terrain. Available rocky

material from specified cuts was used to fortify embankments. The contractor crushed rock on site for all rock slope protection and drain rock material.

In addition, old asphalt was recycled into roadway base rock, and mulch derived from vegetation removed for the project was spread over the flatter slopes to reduce surface erosion. Processing materials on site had the added benefit of reducing truck trips and emissions.

The \$9.5 million project was paid for with state and federal funds. **MM**

Source: *Lupita Franco, public information officer, Caltrans District 2*



Construction crews fortified this embankment along SR 36 on the east end of the project. The contractor used rock from the work site for slope protection and drainage basins, eliminating the need to haul in material from other places, saving time, money and reducing air pollution.



# Mileposts

The Mileposts section is new feature of the Mile Marker that provides a summary of transportation issues affecting Caltrans and California.



## Caltrans' Guiding Planning Document Finalized, Sets Long-Term Spending Strategies for Highway System



Caltrans' comprehensive plan that inventories and grades California highway "assets," and sets ambitious performance goals for their restoration, is now officially the Department's guiding planning document. [The Transportation Asset Management Plan \(TAMP\)](#) has been approved by

the California Transportation Commission, and certified by the Federal Highway Administration (FHWA) — two years ahead of schedule. All state transportation departments must submit TAMPs to the federal government for project planning and funding purposes, and California's document was the first certified by the FHWA.

The TAMP establishes 10-year performance benchmarks

to guide long-range investments for California's highway infrastructure, financed in large part by revenues from the Road Repair and Accountability Act of 2017 (Senate Bill 1). The "state of good repair" objectives apply to the critical components that make up the state and federal transportation network — the interlocking system of pavements, bridges, drainages, traffic management systems, and other infrastructure.

The plan also emphasizes Caltrans' "fix-it first" philosophy, using preventive maintenance to improve or preserve the condition of existing assets, not expand highway capacity.

The TAMP will be updated every other year. Its priorities will help guide preparation of [State Highway Operations and Protection Program](#), which funds repair and preservation of the State Highway System.

MILE  
2

## Highway congestion study cites truck traffic impacts

Trucks disproportionately contribute to congestion on freeways and major arterials, according to a study that identified locations in California where freight-carrying vehicles caused bottlenecks and delays.

A grant from the National Center for Sustainable Transportation funded “Managing the Impacts of Freight in California,” which Caltrans supported through its University Transportation Centers program and Office of

Freight Planning.

In Southern California, those areas included portions of most major freeways, including State Routes 60 and 91 and Interstates 5, 710, 210, 10 and 405. Most major highways in the San Francisco Bay Area were identified in [the report](#). Other high-ranking freight-impact areas were in Sacramento and San Diego, and along Highway 99 between Manteca and Modesto, and just north of Fresno.

MILE  
3

## Report details state bike/pedestrian pathway growth



has paid off: California comes in as the third most bike-friendly state in the nation, an impressive jump from

Caltrans has directed more than a billion dollars in federal and state funds toward bicycle and pedestrian projects over the last two decades. The effort

19th in 2013, according to the League of American Bicyclists.

The 2016-17 [Non-Motorized Transportation Facilities Report](#) details the progress that has been made improving and enlarging California’s pedestrian/bicycle route network. The annual report, sent to the Legislature, also notes that additional revenues from the Road Repair and Accountability Act of 2017 (Senate Bill 1) will finance even more bike- and pedestrian-friendly projects.

MILE  
4

## Caltrans updates bond-financed solar facility portfolio

Caltrans maintains 70 photovoltaic solar installations that supply power to its buildings from one end of the state to the other, with most of them (55) maintenance or equipment facilities, according to the [Clean Renewable Energy Bonds Program 2018 Annual Report](#) to the Legislature.

The Energy Bonds program, authorized as part of the federal Tax Incentives Act of 1995, aligns with Caltrans’ environmental sustainability objectives in its [2015-2020 Strategic Management Plan](#). The program also helps the Department comply with Governor Edmund G. Brown Jr.’s 2012 executive order for state agencies to reduce grid-based energy purchases by at least 20 percent by 2018.

The original cost to purchase and install the solar systems, and bond financing, was \$22.8 million. Since that time, the bond debt service has been winnowed to \$12.4 million. For the life of the system, it is projected that Caltrans will save approximately \$2.8 million.





*An aerial shot shows the massive landslide that, in an instant, wiped out all traces of a section of Highway 1, and dramatically changed the surrounding landscape along the Big Sur coast. Recognizing the highway's importance, Caltrans almost immediately began plans for rebuilding.*

# Iconic Big Sur Route Reclaimed

## Highway 1 Crews Have Realigned, Strengthened Section After Massive Slide

Building a new roadway across the remnants of the largest known landslide ever to strike the Big Sur coast has mostly finished, and Highway 1 opened in mid-July, about two months ahead of schedule.

"Rebuilding Highway 1 and restoring traffic along the Big Sur coast has been our priority and by opening the highway sooner than expected, it will boost the many Central Coast communities affected by this major landslide," said Tim Gubbins, Director for Caltrans District 5 based out of San Luis Obispo.

The slide that buried the highway on May 20, 2017 dumped more than 6 million cubic yards of material atop the roadway and into the ocean, adding 15 acres of new coastline. It occurred after one of the most severe winters on record battered the Central Coast, and the rest of California.

Miraculously, no one was injured or killed by the slide, but the collapsed cliff side obliterated a ¼-mile section of roadway.

Caltrans District 5 immediately readied rebuilding plans, consulting with various state, local and federal resource

agencies. John Madonna Construction of San Luis Obispo was awarded the emergency contract for the project.

The Mud Creek landslide came only months after the Pfeiffer Canyon Bridge, about 36 miles north on Highway 1, was severely undermined by flooding and had to be demolished. With Highway 1 access cut off from the north, and at Mud Creek to the south, the Big Sur community was largely isolated for about five months.

With the goal of reestablishing a link to the outside world as soon as possible, a new Pfeiffer Canyon Bridge was completed in just over a half-year, restoring northern highway access for residents and travelers in October 2017. Traffic has been flowing without incident across the new bridge since that time.

Construction crews on Mud Creek are now busy hauling fill material to create the grade for the northern section of the new highway alignment.

The new roadway has been realigned across the landslide and buttressed with a series of embankments, berms, rocks, netting, culverts and other stabilizing material, according to Department engineers and geologists.

Construction crews on Mud Creek are now busy hauling fill material to create the grade for the northern section of the new highway alignment.

A larger and more interconnected drainage system has been installed. The main feature is a 63-inch diameter pipe that will drain runoff from the southern portion of the project and Mud Creek, which is not a year-round water source but can rage during stormy periods. A four-foot diameter piping network also has been laid, and replaces a series of culverts that would regularly clog with mud and debris.

A 20-foot high berm was constructed as a retaining wall on the south side of Mud Creek. Crews stabilized a 20-foot vertical face on the east side of the berm with a Hilfiker Retaining Wall, a manufactured product made of welded wire matting that holds compacted backfill material. A berm also was constructed on the north side of Mud Creek. The slope will need to consolidate and settle for two to three winters to become more stable.

Construction progressed at a good pace during this herculean effort, despite challenging conditions. Roadwork cannot be done at night or when fog impairs the ability of safety spotters to spot falling rock. The omnipresent threat of more slides also prevents work such as



Crews pour a concrete drainage pad under the five-foot-plus diameter pipe that will drain excess water from the Mud Creek area.

engineered embankment construction from taking place below the ongoing slide removal area.

Caltrans reopened the new Highway 1 alignment at Mud Creek when favorable weather and longer work days moved up the construction schedule. Roadwork will resume with ongoing maintenance activity after the opening, which may require intermittent closures. The project cost is estimated at \$54 million. **MM**

Source: Susana Z. Cruz, public information officer, Caltrans District 5



Construction crews create a new roadway base for the middle and north sections of the Mud Creek project. Access roads have been constructed for future maintenance of the site. A rock barricade, called a revetment, was built along the shoreline to keep the tide from eroding the embankments.

# Intercity Rail Rides Solid Track of Growth

## Ridership, Farebox Collections Up for Caltrans-Supported Amtrak Service in State

California's intercity rail service, supported by Caltrans, continues to show upward trends for on-time performance, ridership, and farebox collections, and the system is poised for more progress with an influx of dollars from the Road Repair and Recovery Act of 2017 (Senate Bill 1).

Caltrans oversees the Pacific Surfliner (San Luis Obispo-Los Angeles-San Diego), Capitol Corridor (Auburn-Sacramento-Bay Area), and the San Joaquins (Oakland/Sacramento-Fresno-Bakersfield) routes, which last year carried almost 5.76 million riders to their in-state destinations.

Rolling under the [Amtrak California](#) banner, the intercity rail service's three lines have posted steady ridership increases since 2014. The Surfliner, with its heavy commuter mix, particularly on the Orange County to Los Angeles route, accounted for more than half of the entire system's ridership with more than 3 million customers in 2017.

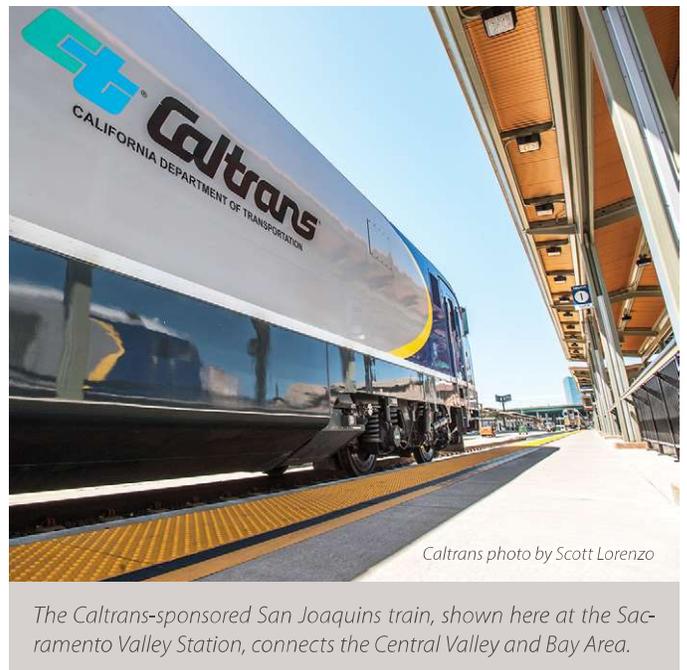
The Capitol Corridor was Caltrans' next most popular intercity rail line, drawing more than 1.63 million riders last year. The San Joaquins that traverse the Central Valley and connect with Sacramento and the Bay Area attracted almost 1.12 million passengers in 2017.

The combined system posted ridership increases of 2.7 percent from 2014 to 2015, 2.2 percent from 2015 to 2016, and 2.4 percent from 2016 through the end of 2017.

### California Amtrak lines among nation's most traveled routes

With those results, Caltrans-funded intercity rail has continued to solidify its place as one of the nation's most popular passenger rail services. The Surfliner ranked second in ridership among all Amtrak routes nationally in 2016, trailing only the Northeast Corridor (Boston to Washington, D.C.) service. The Capitol Corridor was the nation's third most-traveled route, while the San Joaquins ranked sixth.

According to the [2018 California State Rail Plan](#), ridership on California intercity rail lines comprised 38



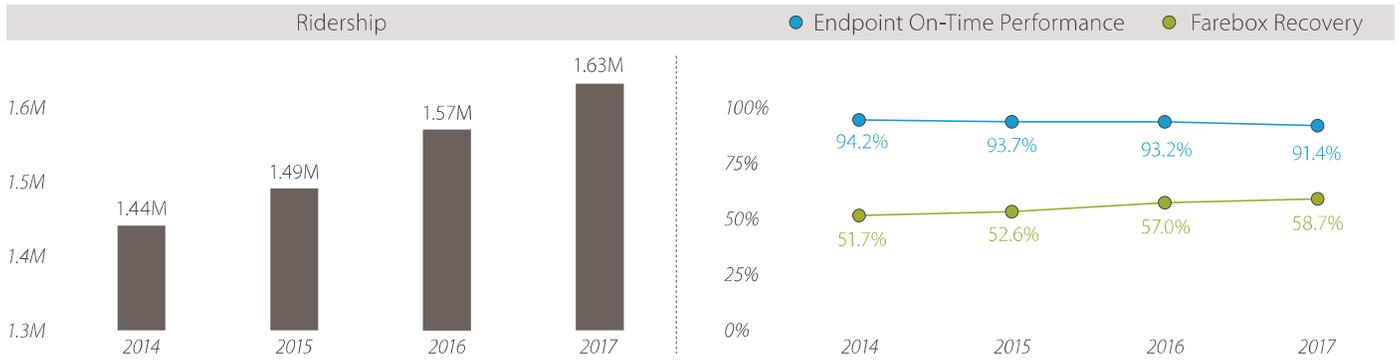
percent of all state-supported passenger train travel in the nation in 2016. The report also says three of the country's 10 busiest Amtrak stations are in California: Los Angeles, Sacramento and San Diego.

In addition to posting ridership gains, the intercity rail system has made strides in other important performance categories. Combined revenue from all three lines rose to almost \$158 million in 2017, a 10.2 percent increase from 2014's \$143.36 million total.

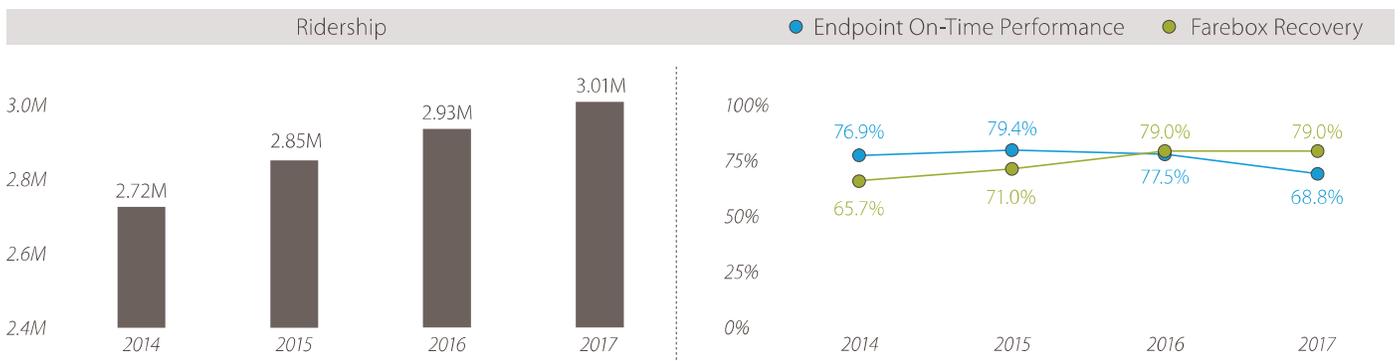
Higher ridership has in turn raised farebox recovery ratios that covered 64.5 percent of the system's total expenses in 2017. The Surfliner led the way with a 79 percent farebox recovery rate in 2017, a marked increase from 2014's 65.7 percent showing. The Capitol Corridor saw a 58 percent farebox collection in 2017, posting gradual increases since 2014's 51.7 percent rate, while the San Joaquin's farebox recovery of 49.3 percent last year was little changed from 2014's 48.3 percent rate.

The federal government sets a 50 percent standard for Amtrak farebox collections. By comparison, the California

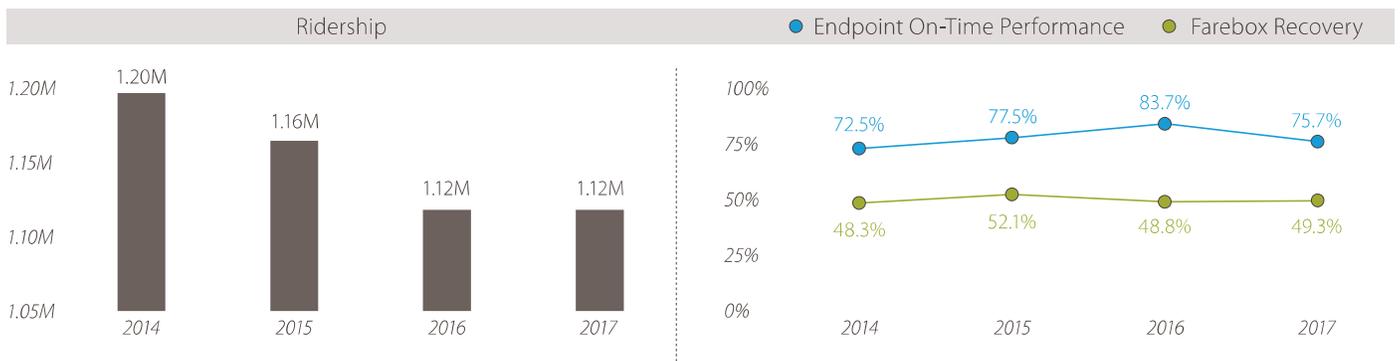
## Capitol Corridor



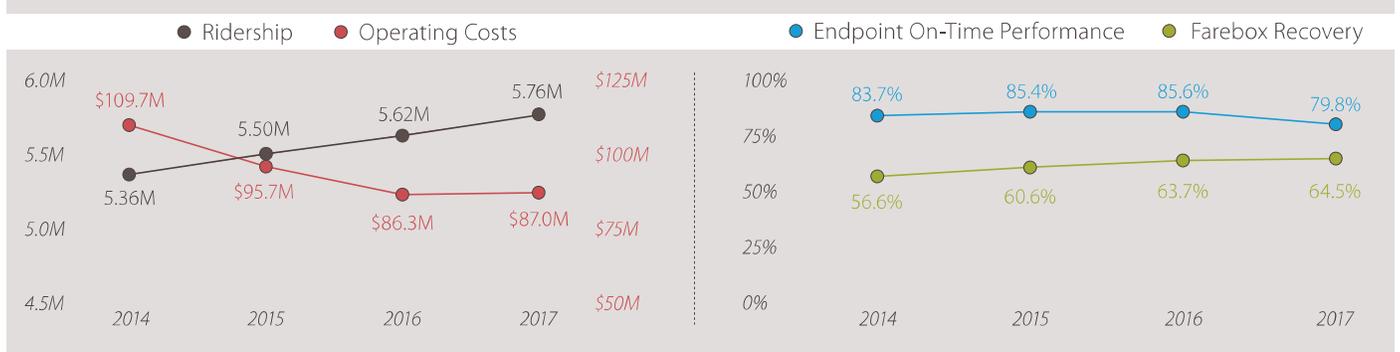
## Pacific Surfliner



## San Joaquins



## Entire System



system now pays for almost two-thirds of its total expenses with customer fares and associated revenues, such as diner car service.

Public subsidies make up the difference, but less so recently for the Amtrak California line. Caltrans' subsidy to the system was about \$110 million in 2014; it dropped to \$86.97 million last year due to increased fare collections and cost controls.

## Caltrans has set 90 percent on-time, end station goal for routes

The intercity rail's on-time record is monitored by Caltrans as part of its 2015-2020 Strategic Management Plan in the system performance category. A 90 percent on-time goal has been established for arrivals at all stations along a particular route, along with a separate target for end stations — a train's final destination.

The Capitol Corridor racked up the best on-time end station record, 91.4 percent, in 2017, and has averaged 93.1 percent since 2014. The Pacific Surfliner managed a 68.8 percent on-time end station performance last year, and cumulative 75.6 percent mark in previous four years. The San Joaquins arrived at their end stations 75.7 percent of the time in 2017, with a 77.4 percent overall on-time record.

The all-stations on-time record is spottier. Amtrak has only maintained those numbers since July 2016, with gaps in reporting. In the latest report period, the Capitol Corridor notched the best on-time, all-stops average, 87.7 percent, with the Surfliner posting an 83.2 percent on-time record and the San Joaquin 73.7 percent.

The route performances of the three lines also depends on a unique operating agreement.

Day-to-day governance is performed by area transportation agencies that have formed joint powers authorities (JPA) for each of the three services. These JPAs contract with Amtrak to conduct the actual operation of the intercity rail services. Caltrans contracts separately with Amtrak to operate and maintain the fleet.

Caltrans supports the JPAs with long-range planning, capital project development and delivery, and most of the rolling stock — the locomotives and coaches used for the three services. Through a variety of funding sources, including the Transit and Intercity Rail Capital Program (TIRCP), the State Transportation Improvement Program (STIP), and additional bond and SB 1 programs, Caltrans is developing projects to improve the speed, frequency, and reliability of these services. *(See following story.)*

## Cleaner, more powerful locomotives joining intercity fleet

Major equipment upgrades are expected soon to help improve overall performance. Caltrans and its partners are expecting delivery of 16 more new generation locomotives by the fall of 2018, joining the first six engines that arrived in 2017. The Charger locomotives, built by Siemens Mobility in Sacramento, meet strict new federal emissions rules while delivering more power. The Chargers will replace most of the older existing locomotive fleet.

New revenues from SB 1 will pay for more upgrades to the intercity rail system. In addition to state highway and local road repair funding, the new law directs a projected \$275 million yearly into the Transit and Intercity Rail Capital Program to modernize public transit systems, increase ridership, reduce greenhouse gas emissions and improve safety.

## Positioned for future growth

It's part of the plan to more fully utilize the passenger rail system and prepare it for future growth. If allowed to develop at its present pace, ridership would grow gradually to an estimated 161,000 daily trips by 2040, the draft State Rail Plan forecasts.

But the system has the capacity to carry 1.3 million daily passengers by 2040, the plan says, if train service is expanded, upgraded, and integrated with local transit and other modes. That represents a 6.8 percent share of the daily passenger miles logged by all modes of travel in California — about 20 times more than the .34 percent share that rail captures now.

In coaxing people from their cars, the state would see a substantial reduction in greenhouse gas emissions. Such a shift would remove more than 13 million metric tons of carbon dioxide annually — the equivalent of planting more than 166 million urban trees each year.

Congestion on the State Highway System also should lessen if more travelers chose rail over vehicles, according to the rail plan, which also touts the inherent safety benefits of railroad travel as compared with driving. **MM**

**Sources:** Kyle Gradinger, Assistant Division Chief, Caltrans Division of Rail & Mass Transportation; Crystal Ortiz, Rail Transportation Manager I; Ryan Sharpe, transportation planner; 2018 California State Rail Plan



Pacific Surfliner



San Joaquins



Capitol Corridor

Pacific Surfliner	<i>San Diego – Los Angeles – San Luis Obispo</i>
351	Miles covering six Southern California counties, much of it along the Southern California coast.
29	Stations, 17 between San Luis Obispo and Los Angeles, and 12 between Los Angeles and San Diego.
12	Daily round-trips between Los Angeles and San Diego. Five daily trips between L.A. and Santa Barbara/Goleta, two between L.A. and SLO via Santa Barbara. Bus connections to Central Valley, East Bay Area, Las Vegas, smaller communities. Connections to Los Angeles Metrolink, San Diego COASTER and Sprinter commuter trains.
Average travel time	San Diego-L.A., 2 hours, 51 minutes. L.A. to Santa Barbara: 2 hours, 37 minutes. L.A-SLO: 5 hours, 28 minutes.
Administration	Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency (LOSSAN). 11-member board of directors composed of elected officials representing rail owners, operators, and planning agencies along the rail corridor. Joint powers agreement started July 2015.
What's New	Initiation of business class service, in which riders can reserve a seat and enjoy a complimentary snack box with beverage; agreement with Los Angeles Metrolink system to accept Surfliner passes.

San Joaquins	<i>Bay Area/Sacramento – Stockton – Bakersfield</i>
316	Miles between Sacramento/Oakland and Bakersfield, with Amtrak Thruway bus service between Sacramento-Stockton and Sacramento-Bay Area.
13	Stations/stops
7	Daily round-trips; five between Oakland and Bakersfield and two between Sacramento and Bakersfield. Amtrak bus connection from Bakersfield to Los Angeles, with bus connections to Yosemite, Las Vegas, Reno, and Redding, smaller communities.
Average travel time (northbound):	Bakersfield to Oakland, 6 hours, 12 minutes. Bakersfield to Sacramento, 5 hours, 12 minutes. Southbound times vary slightly.
Administration:	San Joaquin Joint Powers Authority. Ten member-agencies make up the JPA, formed in July 2015 as a result of legislation.
What's New:	Launch of a "Morning Express" service that arrives in Sacramento from the Central Valley before 8 a.m., allowing riders to complete business in the capital during the work day, then return home by evening.

Capitol Corridor	<i>Oakland – San Jose – Sacramento – Roseville – Auburn</i>
169	Miles from the Sierra Nevada foothills through the capital region to the Bay Area.
15	Weekday round-trips between Sacramento and Oakland; 11 on weekend. Seven daily round-trips between Oakland and San Jose. One daily trip between Sacramento and Auburn. Several Amtrak Thruway bus connections; other buses to South Lake Tahoe/Reno, Central Coast, Redding.
Average travel time:	Sacramento to Oakland, approximately two hours each way. Oakland to San Jose, 1 hour, 4 minutes east, slightly longer west.
Administration:	Capitol Corridor Joint Powers Authority. The first intercity rail JPA formed in 1998. Board consists of two representatives from each of the eight counties along route. Bay Area Rapid Transit provides day-to-day management support under contract.
What's New:	The opening of service to Vacaville.

# State Rail, Transit Service Upgrades Funded

## Transportation Agency OKs \$2.6 Billion for Projects Under SB 1, 'Cap and Trade'

The California State Transportation Agency (CalSTA) in April allocated \$2.6 billion in grants for 28 projects intended to significantly upgrade intercity rail service, overseen by Caltrans, and expand or improve transit options around the state.

A chunk of the Transit and Intercity Rail Capital Program funding (TIRCP) is slated for rail projects that would expand Amtrak service in the Central Valley and along the Southern California coast, help the Los Angeles area prepare for the 2028 Olympics, and speed up travel times in the San Francisco Bay Area.

Caltrans gives financial support to the Pacific Surfliner (San Luis Obispo-Los Angeles-San Diego), Capitol Corridor (Auburn-Sacramento-Bay Area), and the San Joaquins (Oakland/Sacramento-Fresno-Bakersfield) route, which are some of the top-performing routes in the entire Amtrak network. Caltrans also owns much of the California intercity rail rolling stock, including train cars and locomotives, finances capital projects, and leads long-term statewide planning for intercity and commuter rail through the State Rail Plan.

Day-to-day governance of the intercity rail services is performed by area transportation agencies that have formed joint powers authorities (JPA) for each of the three routes. These JPAs contract with Amtrak to conduct the actual operations. Caltrans contracts separately with Amtrak to operate and maintain the combined fleet.

Funding for TIRCP comes from the Road Repair and Accountability Act of 2017 (Senate Bill 1) and California's "Cap and Trade" auction program, established under Assembly Bill 32 to fight climate change and greenhouse gases.

The intercity rail allocations include:

- Almost \$190 million earmarked for improvements in Pacific Surfliner service. More trips between Los Angeles, Santa Barbara and San Luis Obispo are planned that also will tie in to the Los Angeles and San Diego commuter rail services. Investments will be made to improve on-time performance, reliability, and safety. The total cost is estimated at \$267.2 million.

- \$80.3 million toward a project that will move Capitol Corridor trains to a faster Oakland to San Jose corridor, shaving 10 to 15 minutes off 2018 travel times. The grant also will help create a new ticketing system. The total project cost is estimated at \$275 million.
- \$426.7 million to help develop new round-trip services between Fresno, Merced and Sacramento on the Amtrak San Joaquins, expand the Altamont Corridor Express to service Valley cities, and improve connectivity between the Bay Area and Bakersfield. Total estimated cost: \$904.6 million.
- \$10.1 million to extend two daily round-trips from San Jose to Salinas, tying the Monterey Bay region into the statewide rail network and offering an alternative to congestion on US 101. Total estimated cost: \$81.5 million.

Other major TIRCP awards include \$763.7 million to establish more frequent and reliable rail service throughout Southern California, and improve track used by the Pacific Surfliner and Metrolink commuter lines at Los Angeles' Union Station.

Also, CalSTA directed \$330 million to the expansion and modernization of Los Angeles County Metropolitan Transportation Authority service in Southern California, including extension of light rail lines, and integration with other transit services. The total cost through 2028 has been estimated at \$5.77 billion.

Other grants are slated for a variety of bus and light rail projects statewide, and to upgrade the Bay Area Rapid Transit (BART) system. The grants in April represented the beginning of SB 1's eventual \$7.6 billion investment in transit projects, and follow CalSTA's awards of \$51.9 million in State Rail Assistance program funding for projects to improve commuter and intercity rail service, reduce air pollution and ease traffic congestion. **MM**

Source: California State Transportation Agency

# From the Archives

*Workers clean up leftover wood forms and supports, called falsework, from bridge construction on the State Route 57/60 interchange in the Diamond Bar section of Los Angeles. The photo was taken in December 1970.*

