



Director's Message

There's little doubt that the [Road Repair and Accountability Act of 2017](#) (Senate Bill 1) will revitalize California's aging transportation network.

Caltrans is already hard at work on it. In many areas, pavement is already being improved. And we're moving ahead with major repair projects that would have waited years for lack of resources.

SB 1 not only allows the state to catch up on deferred maintenance, but it increases funding to cities and counties for improvements to their local streets and roads. It makes significant investments in transit, bicycle and pedestrian facilities. It will improve freight corridors and congested corridors throughout the state.

And there's another benefit to SB 1 that's not as obvious as filled-in potholes or smoother roads. SB 1 lays the ground rules for improved transparency and accountability while creating California's travel network of the future.

Communities will have a seat at the table. Drivers, cyclists and pedestrians will play key roles. The concept of stakeholder is expanding. This is all part of a healthy evolution in our understanding of the transportation network and a growing appreciation of our shared roles in solving the challenges ahead.

SB 1 lays the ground rules for improved transparency and accountability while creating California's travel network of the future.

Caltrans has always prided itself on the "hard skills" of designing and operating a world-class transportation system. Over the last several years, we have improved the "soft skills" of inclusion, transparency and communication.

So, along with the much-needed resources to catch up on long-delayed repairs, SB 1 brings a new level of collaborative community engagement, and the promise of a shared, equitable and sustainable transportation future.

That inclusive process is well underway at the Department in partnership with the California Transportation Commission, which is overseeing several of SB 1's major transportation programs.

The Department and the Commission have been reaching out around the state, gathering feedback and setting guidelines for competitive programs created by SB 1 to improve critical freight routes, ease congestion on urban highways, and provide matching dollars for qualified local projects.

Judging by the level of input already, we are on the right track.

Malcolm Dougherty

Cover: The effort to clear snowbound Highway 108, Sonora Pass in the Central Sierra, shows the magnitude of last winter's massive storms. The photo was taken in May 2017. Caltrans works year-round to keep California's highway system open for motorists and commerce when the weather turns. Seasonal workers are added, and an array of equipment is fine-tuned and ready to go. See article, page 20. Photo by Chris Baker

Caltrans MileMarkers



Safety and Health

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

Fatalities	2013	2014	Goal
Auto Fatalities per 100 Million Miles	0.67	0.71	Less than 0.5
Pedestrian Fatalities	257	227* -11.7%	Reduce 10% Annually
Bicycle Fatalities	30	16* -46.7%	Reduce 10% Annually

* Most recent available data

Programmed vs. Allocated Active Transportation Funds to Date			
	Fiscal Year	% of Programmed Funds Allocated	Goal
First Call for Projects	2014-15	99%	100%
	2015-16	85%	
Second Call for Projects	2016-17	83%	100%
	2017-18	16%*	
	2018-19	N/A	

* Fiscal year to date

Other Safety and Health Markers	Previous Reporting	Most Recent	Goal
Percentage of Active Transportation Projects Awarded Within Six Months	60% 2016-17, Q4	60% 2017-18, Q1	100%
Employee Work-Related Injuries/Illnesses per 200,000 Hours Worked ‡	5.76 2016-17, Q3	5.25 2016-17, Q4	5.45
Number of Injuries For Autos, Bicycles and Pedestrian Modes of Travel	77,222 2013	74,490 2014*	Reduce 5% Annually
Worker Fatalities in Work Zones	2 2016	1 2017	0 Per Calendar Year

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

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

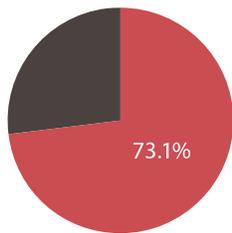
Performance Goals



Stewardship and Efficiency

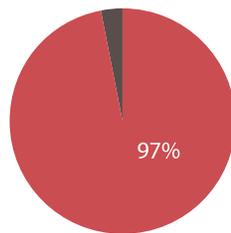
Money counts. Responsibly manage California's transportation-related assets.

Percentage of Transportation Management System Units in Good Condition



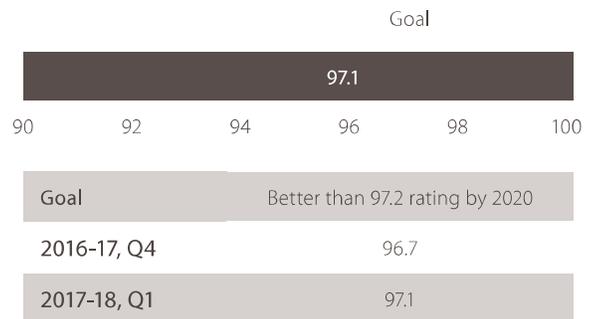
Goal	90% by 2020
Apr.-June 2017	67.7%
July-Sept. 2017	73.1%

Planned Projects Delivered in Fiscal Year

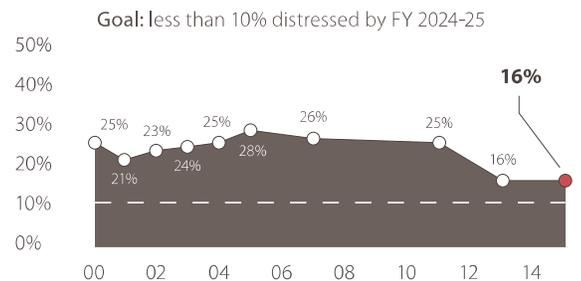


Goal	100%
2015-16	98%
2016-17	97%

Percentage of Bridge Deck Area in Good or Fair Condition



Pavement Health Index



Information Technology Projects	2016 17, Q4	2017 18, Q1	Goal
Info Advantage System Uptime	99.67%	100.00%	99% by 2020
Caltrans Network Uptime	99.72%	99.37%	99.5% by 2020
Response to Employee IT Requests Within Two Hours	39.10%	37.7%	40% by 2020

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

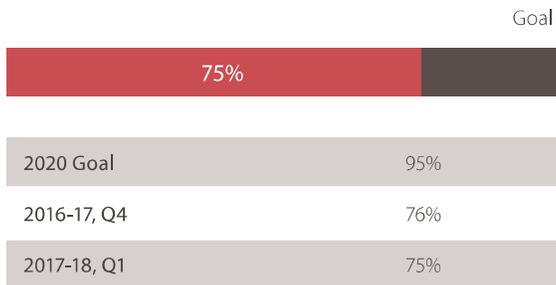
Caltrans MileMarkers



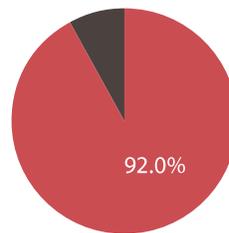
Stewardship and Efficiency

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

Encroachment Permits Approved or Denied Within 30 Days

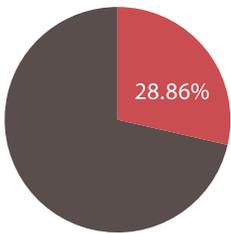


Percentage of Online Single-Trip Permit Requests Handled in Less Than Two Hours



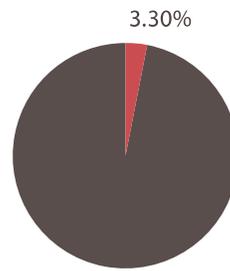
2020 Goal	90%
2016-17, Q4	97.0%
2017-18, Q1	92.0%

Contract and Procurement Dollars Awarded to Small Businesses Annually



2020 Goal	25%
2015-16	46.05%
2016-17	28.86%

Contract and Procurement Dollars Awarded to Disabled Veteran Business Enterprises Annually



2020 Goal	5%
2015-16	5.07%
2016-17	3.30%

Other Stewardship and Efficiency Markers	Previous Reporting	Most Recent Reporting	Goal
Federal Funds Used in Year of Availability (Annually)	100% 2015-16	100% 2016-17	100%
Americans with Disabilities Act (ADA) Expenditures Programmed (Annually)	\$39.8 Million 2015-16	\$40.7 Million 2016-17	\$35 Million
Number of Lane Miles of State Highway System Relinquished (Through 2020)	52.85 Lane Miles 2015-16	88.44 Lane Miles 2016-17	50 Lane Miles

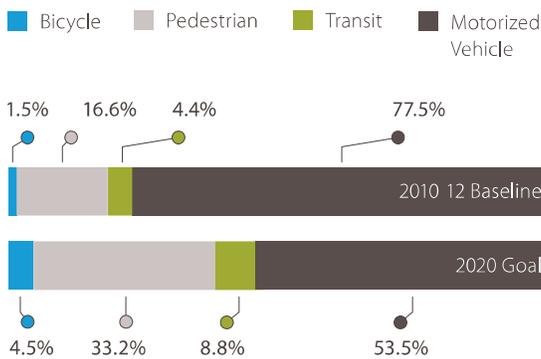
Performance Goals



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

Goal	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)

Goal	By 2020, 15% lower than 2010 baseline
2010 Baseline	217,485
2016	129,168 -40.6%



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	Goal
Percentage of Projects That Include Complete Streets Features	27% 2016-17	28% 2017-18 (through Q1)	68% by 2020
Number of Complete Streets Features on State Highway System	1,543 2016-17	1,855 2017-18 (through Q1)	1,613 by 2020
Percentage of Fully Implemented High-Focus Action Items From Action Plan 2.0	50% 2016-17	71% 2017-18 (through Q1)	100% by 2018

Other System Performance Markers	Previous Reporting	Most Recent Reporting	2020 Goal
Accurate Reporting of Traveler Information (Travel Times, Construction Activity, Incidents, and Adverse Weather)	94.0% 2015-16	93.9% 2016-17	85%
Provide Real-Time Multimodal System Information Available to the Public (Number of Corridors)	3 2016-17, Q4	3 2017-18, Q1	13
Completed Corridor Implementation Plans	4 2016-17, Q4	4 2017-18, Q1	3
Number of Corridors With Integrated Corridor Management Implementation	2 2016-17, Q4	2 2017-18, Q1	5

Caltrans MileMarkers



System Performance

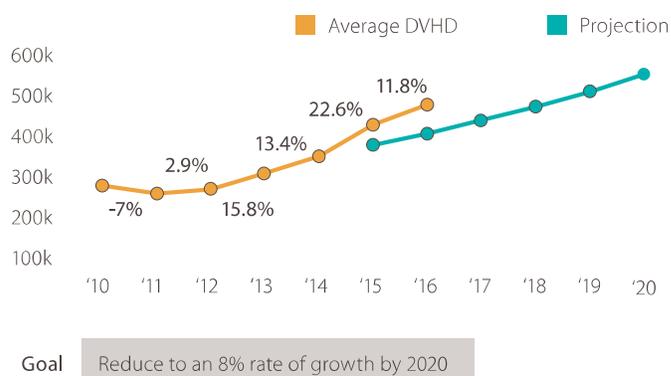
Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.

Travel Time Reliability

R Reliable M Moderately Reliable U Unreliable

	Baseline	2016 17 (Q4)	2017 18 (Q1)	2020 Goal
Highway 57	U	M	M	
I-110	M	M	M	One-tier improvement from baseline
I-80	U	M	U	
I-210	M	R	M	

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



Average All Stations On Time Performance for Intercity Rail

	2016 17, Q4	2017 18, Q1	Goal
Capitol Corridor	95.4%	95.2%	90%
Pacific Surfliner	80.5%	79.3%	90%
San Joaquin	82.8%	79.2%	90%

End Station On Time Performance for Intercity Rail

	2016 17, Q4	2017 18, Q1	Goal
Capitol Corridor	93.2%	92.6%	90%
Pacific Surfliner	64.4%	64.0%	90%
San Joaquin	80.1%	77.0%	90%

Daily Vehicle Hours of Delay (Top Four Integrated Corridors)

	2016 17, Q4 (Year Over Year)	2017 18, Q1 (Year Over Year)	Goal
Highway 57	-15.3%	-24.6%	Less Than 6% Increase Annually
I-110	-5.4%	-8.9%	Less Than 6% Increase Annually
I-80	30.0%	34.1%	Less Than 6% Increase Annually
I-210	23.4%	11.1%	Less Than 6% Increase Annually

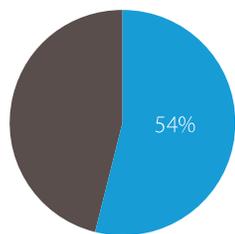
Performance Goals



Organizational Excellence

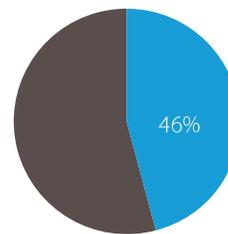
Be a national leader in delivering quality service through excellent employee performance, public communication and accountability.

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



Goal	5% annual improvement from 2015 baseline
2015	External 43%, Internal 37%
2016	External: 54% Internal: 49%

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



Goal	5% annual improvement from 2015 baseline
2015	External 36% Internal 32%
2016	External: 46% Internal 37%

Other Organizational Excellence Markers	2015	2016	Goal
Employees Who Indicate That They Work in a Positive Environment	50%	57%	5% annual increase
Abusive Conduct Prevention Trainings Provided Per Year	37%	81%	100% every 2 years
Caltrans Employees Who Agree That Employees are Encouraged to Try New Ideas	40%	47%	75% 2016 goal, then achieve and maintain through 2020
External Survey Respondents Who Said Caltrans Doing a Good or Excellent Job in Meeting Their Needs	40%	61%	75%
Caltrans Employees Who Rate Caltrans Management as Open and Honest in Communications	44%	51%	5% annual increase
Mile Marker Publications Produced on Quarterly Schedule	4	4	4
Positive Responses to Ethics Questions on Employee Survey	79%	81%	5% annual increase
Increase in the Number of Partners Who Agree or Strongly Agree That Caltrans is a Collaborative Partner	40%	50%	75% 2016 goal, then maintain or improve through 2020
Increase in Employees Serving on Research and Policy Committees to Further National Engagement	38	44	7% increase for 2016, then maintain or improve through 2020
Documented LEAN 6 Sigma Process Improvements (Cumulative)	19	36	30 internal improvements by 2016 with 15 each subsequent year
Number of Caltrans Employees Trained as LEAN 6 Sigma Green Belts	13	14	Train 10 yearly
Eligible Employees Who Have Completed Leadership and Development Training Programs, per Fiscal Year	52% 2016-17, Q3	54% 2016-17, Q4	85% by 2015 with a 2.5% annual increase to 90% in 2017



What will be a new four-lane, Highway 46 East expressway takes shape in the Shandon area in San Luis Obispo County. The Highway 46 Corridor Improvement Project was launched in 2008 to upgrade a two-lane rural road to a modern highway capable of handling increased traffic.

Projects Transform Popular Route

Work Continues to Complete a Wider, Safer Highway 46 from Kern to Coast

Over the last decade, Highway 46 has evolved, several miles at a time, from a rural two-lane path over the Coast Range to a broad expressway better able to serve a traffic flow that has more than doubled in recent years.

Construction projects will continue for several years as Caltrans and its partners improve the 60-mile section straddling the agricultural fields starting from I-5 in Kern County to the vineyards and tourist destinations along Highway 101.

With great beaches, resorts, a major summer fair, Hearst Castle and a flourishing wine industry, California's Central Coast is more popular than ever. In Paso Robles, at the west end of Highway 46, Caltrans' traffic surveys counted 17,300 vehicles during a busy month in 1997. By 2015, the number had jumped to 36,500 vehicles tallied during the same monthly period. Overall, one million people live in the Central Valley between Fresno and Bakersfield, so traffic volumes will likely continue to rise.

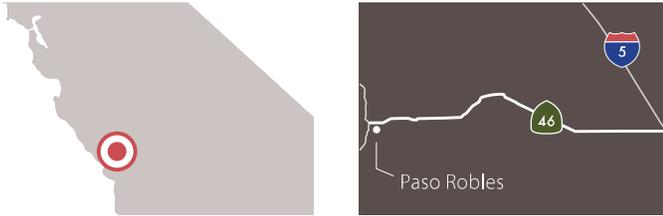
In 2008, Caltrans began a major widening effort — the [Highway 46 Corridor Improvement Project](#) — to improve mobility and enhance safety on what had mostly been a two-lane highway between the Central Valley and Central Coast.

In California, highway construction is performed by contractors overseen by engineers from one of Caltrans' 12 regional districts. Highway 46 stretches through two Caltrans districts, each of which undertook portions of the highway, essentially moving from both ends toward the middle.

Caltrans' District 5, based in San Luis Obispo, has completed three major widening projects on the Central Coast stretch of 46, transforming 14.1 miles of the route into a four-lane expressway and currently working on the fourth phase.

Meanwhile, Caltrans District 6, which oversees the state highway system in Kern County, has been improving Highway 46 from the Central Valley side. Three project segments totaling 27.5 miles west to the Kern-SLO county line have been completed;

Project Spotlight



travelers now enjoy a four-lane expressway with a wide median.

The next phase of work in Kern County is scheduled to begin in early 2018, with a reconstruction of the Highway 46–I-5 interchange, and the widening of 46 to a four-lane highway with a raised median along a two-mile commercial zone.

About \$100 million was spent to complete the three Kern project segments. The upcoming construction is budgeted at about \$18 million.

The final 46 project in Kern proposes to close the 4.5-mile gap between finished sections through the community of Lost Hills and connect with I-5.

Reducing the number of serious collisions on 46 is one of the major goals of upgrading the busy valley-coastal corridor.

The design phase of that project is expected to begin this summer.

On the San Luis Obispo side of Highway 46, more than 14 miles of highway has been reconstructed since 2008 from the city of Paso Robles east to the Shandon area. About \$118 million has been spent on those three phases of the overall project. One of the construction highlights was the placement of twin bridges crossing the Estrella River.

A five-mile widening of the highway near Shandon is now underway, and the \$47 million project is expected to be complete by the end of 2018. Plans call for construction to the Cholame area. The projected \$55 million project is expected to begin in late 2019.

Steps to improve safety

There are also plans to rebuild the Highway 46/Highway 41 interchange in Cholame, where week-

At left, a survey crew stakes out the parts of the new Highway 46 as an excavator equipped with a claw breaks up earth. The aerial photo shows construction on 46 in the Whitley Gardens area of San Luis Obispo County, east of Paso Robles, including work on the Estrella River Bridges.

Caltrans photo by Steven Hellon



ends bring especially busy traffic as motorists coming from the Fresno, Visalia-Tulare, and Bakersfield areas converge with those traveling to and from the Central Coast. A construction date has not yet been determined.

Reducing the number of serious collisions on 46 is one of the major goals of upgrading the busy valley-coastal corridor. Efforts appear to be paying off. On one improved stretch in San Luis Obispo County, the number of significant collisions recorded by the California Highway Patrol dropped from 37 during 2005-2008, prior to construction, to 29 during the three years after completion.

The agricultural and trucking industries that are major contributors to the Central Coast economy also will benefit from safer highway conditions.

Caltrans also has taken other steps to improve safety on 46, such as adding a daytime headlight section, providing increased road striping and sig-

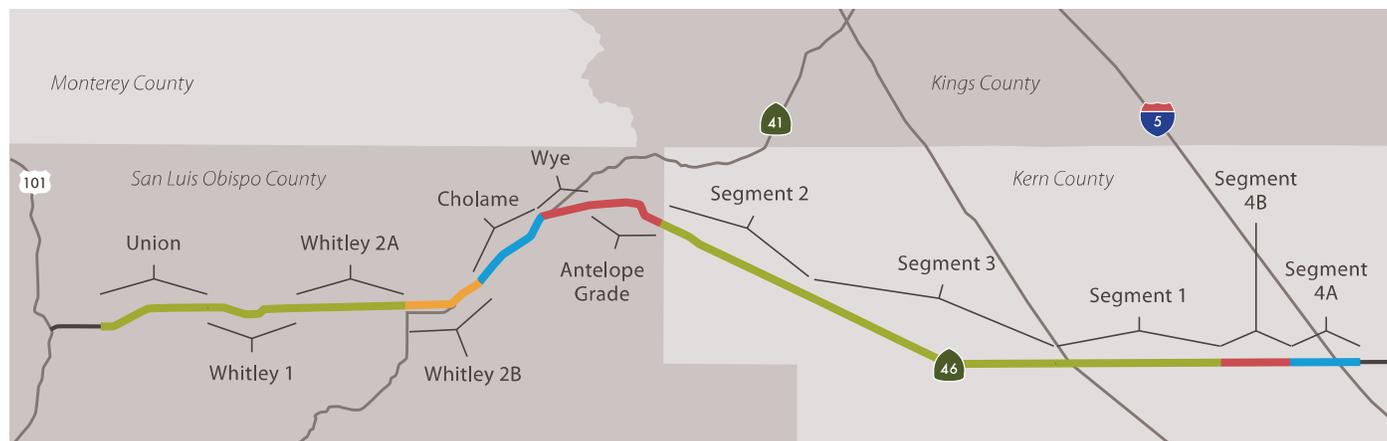
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nage, and placing median barriers in targeted travel lanes to prevent head-on or broadside collisions.

“These widening projects have shown our commitment to safety along this corridor and we are very pleased with the progress we have made so far along this inter-regional route,” said Caltrans District 5 Director Tim Gubbins. **MM**

Source: Jim Shivers, Public Information Officer, Caltrans District 5; District 6 Public Affairs Office

Highway 46 Corridor Project



Segment	Length (Miles)	Phase	Construction Cost (Millions)
Union	5.0	Completed	\$33.3
Whitley 1	4.0	Completed	\$47.0
Whitley 2A	5.1	Completed	\$38.1
Whitley 2B	4.0	Construction	\$45.7
Cholame	4.4	Design/Right of Way	\$55.0
Wye	3.2	Planned	\$111.0*

Segment	Length (Miles)	Phase	Construction Cost (Millions)
Antelope Gr.	3.1	Planned	\$43.2*
Segment 2	7.3	Completed	\$24.3
Segment 3	12.5	Completed	\$45.3
Segment 1	7.7	Completed	\$24.2
Segment 4A	3.0	Design/Right of Way	\$17.5
Segment 4B	3.0	Planned	\$50.0*

* Unfunded Need



A new path for bicyclists and pedestrians across the east span of the Bay Bridge debuted in 2016 as part of the Bay Bridge Trail. The 15.5-foot-wide, striped path is among the projects that Caltrans has built and promoted as part of its "Toward an Active California" bicycle and pedestrian plan.

SB 1 Quickens Bicycle-Walking Pace

More Active Transportation Projects Lined Up as Alternative to Vehicle Travel

Funding from the Road Repair and Accountability Act of 2017 (Senate Bill 1) will bolster Caltrans' efforts to triple the amount of bicycling, and double the amount of walking and transit use in California by 2020 from 2010 levels.

Relying on SB 1's dependable new revenue stream, the California Transportation Commission (CTC) in October committed \$117 million to 63 bicycle and pedestrian projects across the state through the [Active Transportation Program](#) (ATP). (See following story.) An additional 22 of these projects, valued at \$99 million, were approved for funding sooner than originally planned.

The Active Transportation Program allows cities, counties, transit agencies and other public entities to compete for grants to build bicycle/pedestrian paths, install bike racks or complete other projects that make walking and biking easier, safer and more convenient. The CTC action in October provides more money for these local agencies to commit to Active Transportation Projects in their areas.

Signed into law in April 2017, Senate Bill 1 — the largest transportation investment bill in state history — will contribute an extra \$1 billion over 10 years for projects that encourage walking and bicycling — almost doubling what the ATP had received annually to this point.

The coming projects will consist of bicycle and multi-use paths, sidewalks, bicycle lanes, and safe routes to school for schoolchildren. This work will help Caltrans move "[Toward an Active California](#)," the state's first bicycle and pedestrian plan introduced earlier this year. The plan calls for expanding transportation options for pedestrians and bicyclists of all ages, abilities and incomes through safe, accessible mobility projects and policies that integrate active transportation, land use, and rail and transit facilities.

Each of Caltrans' 12 regional districts will work with local agencies and advocacy groups to gather data, conduct public outreach, identify priorities and funding sources for projects that align with active

transportation goals and objectives, including the [“Complete Streets”](#) program.

The objective of a complete street is to provide safe access and mobility for users, including bicyclists, pedestrians, transit and passenger rail riders, and motorists, appropriate to the function and context of the facility. Complete streets reflect community preferences, the types of road users, and their needs.

Studies show that adding bike lanes or roundabouts, and other roadway reconfigurations, slow down drivers and make roads more accommodating and encouraging for pedestrian and bicycle trips.

Progress in encouraging non-motorized travel has been steady in California. Between 2000 and 2010, bicycling increased from 0.8 percent to 1.5 percent of all trips, and the rate of walking rose from 8.4 percent to 16.6 percent, according to the California Household Travel Survey.

The 2020 targets seek to raise the number of trips by bike to 4.5 percent, and 33 percent for pedestrian travel.

The bicycle and pedestrian projects funded by the CTC not only encourage active modes of transportation, but also support livable communities and healthier, less polluting travel choices.

In 2017, the first separated (also known as “protected”) bikeway on the State Highway System was

The 2020 targets seek to raise the number of trips by bike to 4.5 percent, and 33 percent for pedestrian travel.

built in Albany (Alameda County). The Albany project features a landscaped buffer and bicycle signals to protect bicyclists from motorized vehicles.

In December 2016, the first “protected intersection” on a state right of way was built in San Francisco. The improvements at 9th and Division streets include a protected bikeway, concrete islands at the corners and raised crosswalks.

Also in 2017, officials in the city of Joshua Tree in San Bernardino County’s high desert celebrated new green bike lanes and diagonal parking designed to more safely move vehicles, pedestrians and bicyclists along State Route 62, Twentynine Palms Highway. **MM**

Sources: “Toward an Active California State Bicycle + Pedestrian Plan”; Ann Mabaney, Chief, Smart Mobility and Active Transportation Branch; Dustin Foster, Associate Transportation Planner; Sergio Ruiz, Pedestrian & Bicycle Coordinator / Branch Chief Caltrans District 4

On These Routes, Leave the Car Behind

In October, the California Transportation Commission approved funding for 63 Active Transportation Projects and accelerated funding for 22 others. Among the major projects OK’d:

Moss Landing bridge and pathway: A bike and pedestrian bridge and pathway project was awarded \$7.5 million from an SB 1 grant. Stretching from north of Elkhorn Slough to the southern portion of Moss Landing, the segment eventually will be part of the Monterey Bay Sanctuary Scenic Trail.

West Santa Ana Branch Bikeway Phase 2 in the city of Paramount: This \$4.3 million bikeway will provide an underserved community with a safe link to schools, parks, shopping and employment centers. It will also connect the nearby Los Angeles River Trail and San Gabriel River Trail, and offer convenient connections to regional destinations.



Caltrans photo by Sergio Ruiz

In Albany (Alameda County), the first separated bikeway on the State Highway System debuted in 2017 as part of the UC Village Project.



Caltrans photo by Sergio Ruiz

The first protected intersection to better shield pedestrians and cyclists in San Francisco opened last year at 9th and Division streets.



The State Route 15 Commuter Bikeway in San Diego opened to the public last August, a one-mile section connecting Mid-City communities and separated from busy SR 15. Caltrans was one of the partners in the joint project. Preliminary engineering has begun on a connecting segment.

Santa Gertrudis Creek pedestrian/bicycle trail extension and interconnect: This project in Temecula was granted \$3.7 million to extend the existing Santa Gertrudis Creek Pedestrian/Bicycle Trail, provide under crossings at key points (including under I-15), and connect with the Murrieta Creek Multi-Purpose Trail.

Napa State Route 12 Channelization Project: Improvements were made to the railroad crossing at State Route 29 and Whitehall Lane, and the bikeway realigned so that bicyclists cross the railroad tracks in a safer direction. Caltrans also incorporated green pavement marking, striping, raised medians or islands, markers and signs.

Complete Streets projects that Caltrans helped construct in 2017

Sloat Boulevard (State Route 35 in San Francisco) Complete Streets Project: Caltrans this year added more beacons and curb extensions, and extended bike lanes at this multi-phased project. Caltrans put a portion of Sloat Boulevard on a “road diet,” starting in 2012, shrinking the number of lanes from three to two, and adding bike lanes and improving crosswalks. In 2013, the city installed new crosswalk beacons at Forest View Drive.

State Route 15 Commuter Bikeway: In August, a ribbon cutting was held for the opening of the SR-15 Commuter Bikeway, a one-mile, two-way bikeway facility adjacent to State Route 15 in San Diego. The bikeway is separated from the freeway using a concrete barrier, and the path will provide a direct route between two neighborhoods in San Diego. The bikeway will be lit to allow riding during evening hours.



Roundabouts, such as this one at the Nice-Lucerne cutoff on Highway 20 in the Clear Lake area, take some getting used to, but motorists usually wind up embracing them. The circular intersections improve traffic flow, reduce delays, and cut emissions due to vehicles not idling at street lights.

Rounding Out a Traffic Strategy

Roundabouts Have Proven Safer Than Traditional Intersections; More Coming

The first thing to know about roundabouts is that they aren't all, well, round. Some are oval. Others are shaped like a raindrop, a dog bone or something similar. Some are simple with a single circular lane around a central island; others are more complex, and might include multiple lanes or a bike path.

No matter their shape or size, Caltrans has been helping design and promote more of them. They exist or are planned in almost every Caltrans regional district. Roundabouts reduce speeds, cut air pollution and fuel consumption, and often complement or are components of programs such as Complete Streets, which seek to provide safe mobility for all types of travelers.

Roundabouts are more common in Europe, where they've been used for generations. In California, the number of roundabouts on the State Highway System increased from 21 in 2014 to 37 in 2017, and dozens more are planned.

The Federal Highway Administration Office of Safety has identified roundabouts as a proven safety

measure. A typical roundabout has eight places where vehicles might collide, compared with 32 "points of conflict" at a traditional four-legged intersection. In roundabouts, none of the conflict points are at right angles, reducing serious "T-bone" accidents so when crashes do occur, they are less likely to cause injury or major property damage.

While roundabouts remain unfamiliar to many Californians, studies show that travelers tend to embrace roundabouts after getting used to them. The Insurance Institute of Highway Safety (IIHS) found in a 2001 survey that, before construction, 31 percent of drivers favored a roundabout, with 41 percent strongly opposed. After driving on the roundabout, 63 percent were in favor with 15 percent strongly opposed.

IIHS, in partnership with the Federal Highway Administration (FHWA) has shown that roundabouts typically achieve improved safety benefits compared with signalized or side-street stop intersections.

By allowing vehicles to move through intersections

National Study Findings

37% Reduction in overall collisions

75% Reduction in injury collisions

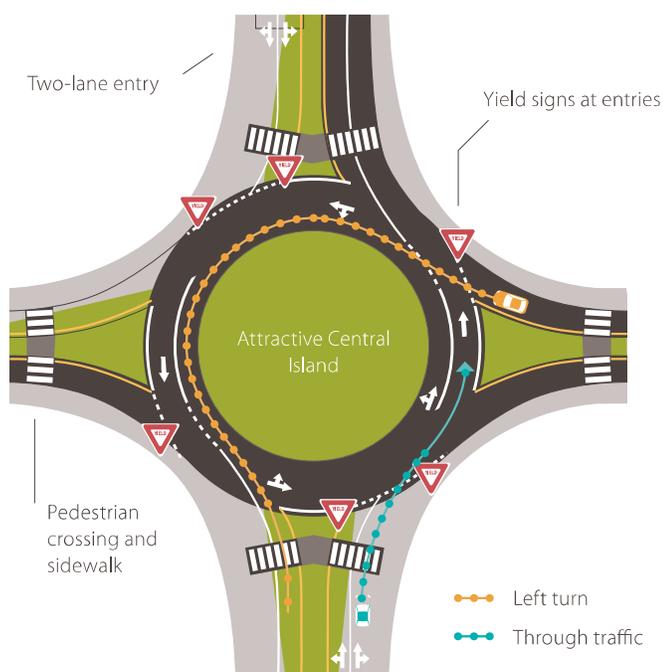
40% Reduction in pedestrian collisions

90% Reduction in overall fatalities

without stopping, roundabouts improve traffic flow, significantly reduce traffic delays and decrease pollution and greenhouse gas emissions. The FHWA also found that roundabouts increased traffic capacity by 30 percent to 50 percent compared with signalized intersections.

Roundabouts also can provide an attractive gateway, and, because they slow traffic, help accommodate walking and bicycling. Pedestrians cross only one direction of traffic at a time, and bicyclists can usually ride through a roundabout at a speed similar to vehicles. Many roundabouts on the State Highway System are being designed with wide, multi-use

Roundabout Design



Roundabouts improve traffic flow and significantly reduce traffic delays and decrease pollution and greenhouse gas emissions by allowing vehicles to move through intersections without stopping.



Studies show that roundabouts, this one at Interstate 5 and Deschutes Road in Anderson, lead to fewer accidents and deaths.

paths around the perimeter for bicyclists.

There's also a cost savings advantage: Roundabouts require less maintenance than traffic signals.

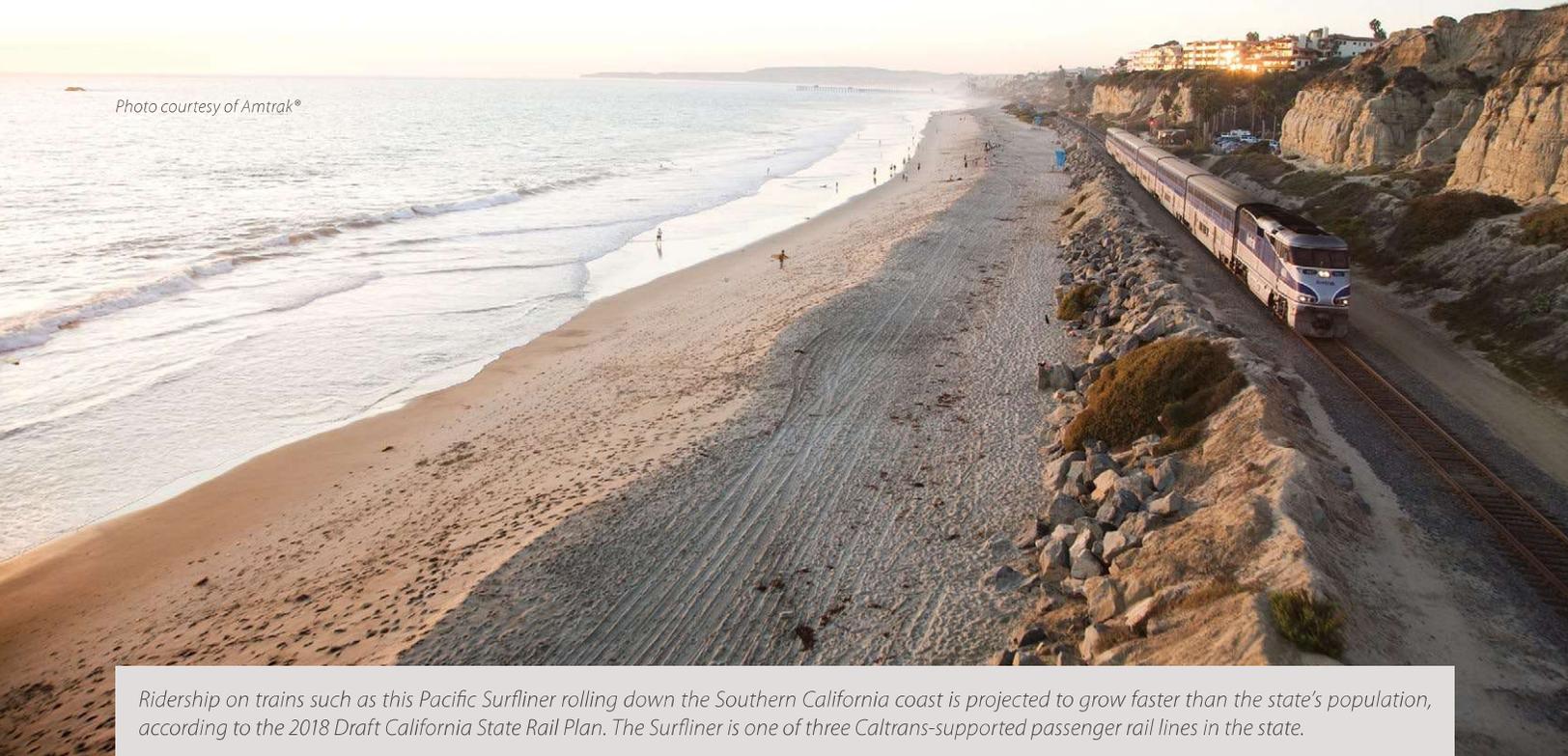
In 2013, Caltrans adopted an Intersection Control Evaluation process that helps determine the best solution for any intersection, rather than just automatically placing a signal, as had been done in the past. The process requires all feasible alternatives to be evaluated, and the focus is on performance.

Some circular intersections are intended to accommodate local development. In Hanford (District 6), where a Costco store was being built, a roundabout was designed and built because it was projected to be a better traffic regulator than the upgrade of an existing traffic signal, given the heavy volumes expected.

Caltrans works with local groups on designs of roundabouts. In Tulare County (District 6), Caltrans partnered with the Tule River Indian Reservation to incorporate a basket weave design, and plant deergrass, used for making baskets, in the central island. **MM**

Sources: "California State Highway System Roundabout Inventory Report"; John Y. Liu, Acting Assistant Division Chief, Traffic Operations; Federal Highway Administration.

Photo courtesy of Amtrak®



Ridership on trains such as this Pacific Surfliner rolling down the Southern California coast is projected to grow faster than the state's population, according to the 2018 Draft California State Rail Plan. The Surfliner is one of three Caltrans-supported passenger rail lines in the state.

Plan Pictures Future of Train Travel in State

Caltrans Report: System Upgrades Needed to Draw More Passengers, Freight

Caltrans' newly released draft 2018 [California State Rail Plan](#) envisions an era of sustainable, door-to-door mobility in which travelers seamlessly transfer between services with a single ticket, and freight shipments traveling a more direct and efficient path to their intended markets.

The draft plan forecasts a rail system by 2040 that's so intuitive and interconnected it will become the preferred mode for many trips in California. At the same time, an investment in the state's rail delivery system is predicted to generate multiple economic benefits while easing highway congestion and air pollution as more people and shipments ride the rails.

The draft plan debuts at an opportune time. The Road Repair and Accountability Act of 2017 (Senate Bill 1), passed earlier this year, is set to provide long-term revenues to upgrade the state's passenger and freight rail system, in addition to other public and private investment.

According to the rail plan, the demand will be

there. By 2040, passenger rail trips are expected to increase more than tenfold to over 1.3 million per day, outpacing California's projected population growth of 30 percent. Freight loads, crucial to the sixth largest economy in the world, will be 38 percent higher in 2040 than they were in 2013, the plan estimates.

By 2040, the plan forecasts:

- More trains, more often — with departures every 30 minutes or better in most markets.
- Efficiencies that double freight movement on existing rail corridor rights-of-way.
- Improved trade corridors, rail yards and terminals tied together in an integrated freight transport system. In addition, short lines that are a critical link in the state's rail shipping picture will be upgraded to haul heavier loads.
- Significantly faster trips using high-speed rail.
- Express buses in dedicated lanes to carry passengers to and from rail with reliable journey times.
- Quick and easy transfers between bus and rail

With more alternatives to driving or using trucks to haul freight, the state would see a substantial reduction in greenhouse gas emissions.

service at transit hubs that synchronize connections and reduce delay.

- Single-ticket system integration.
- Clean and quiet electric trains powered by 100 percent renewable energy.

Current ridership on intercity rail service that Caltrans supports — the Capitol Corridor (Auburn-Bay Area), the San Joaquin (Sacramento-Bakersfield), and Pacific Surfliner (San Luis Obispo-San Diego) — and regional systems totals about 110,000 daily trips now. If allowed to develop at its present pace, ridership would grow gradually to an estimated 161,000 daily trips by 2040, the report says.

A big upside from more riders, freight

But the system could serve 1.3 million daily passengers by 2040 if train service is expanded, upgraded, and integrated, the plan asserts. That represents 6.8

percent share of the daily passenger miles logged by all modes of travel — about 20 times more than the .34 percent share rail captures now.

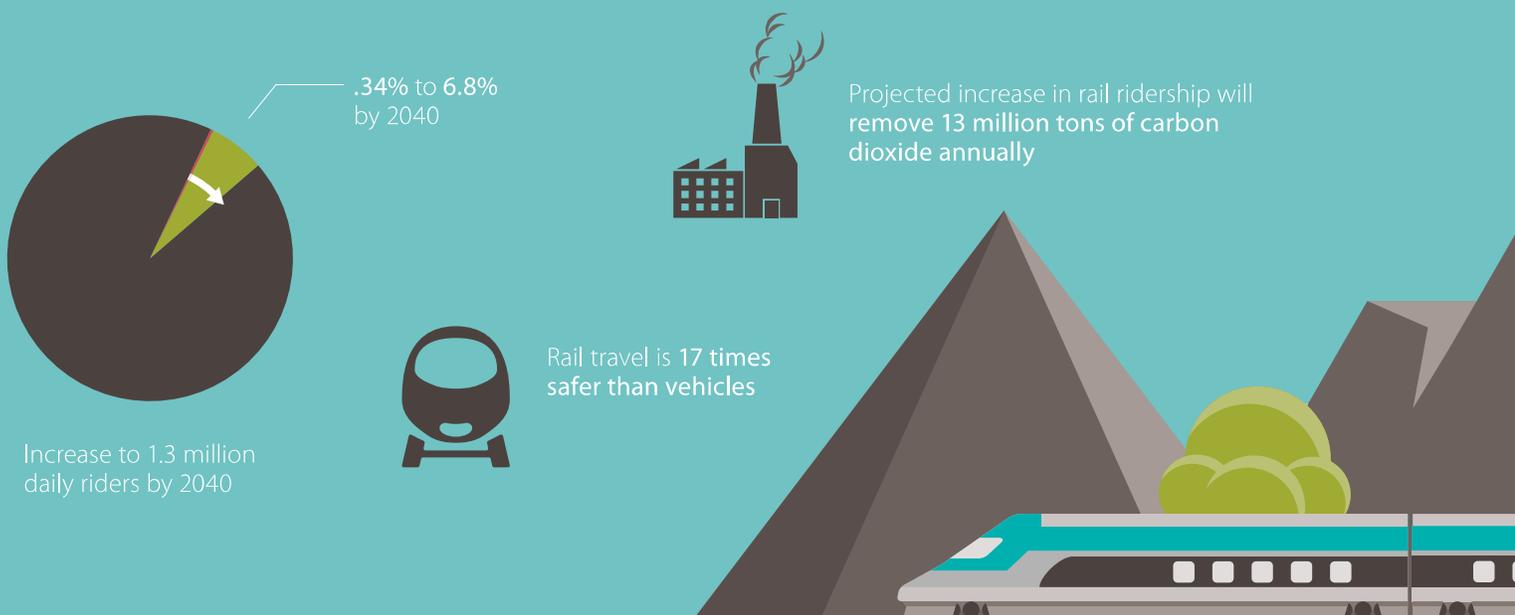
To realize these projections, 88 million daily passenger miles would shift from highways to railroads. The plan projects that more than half of all passenger trips would be on electric-powered trains.

With more alternatives to driving or using trucks to haul freight, 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 also should lessen if more travelers chose rail over vehicles, and more truck loads are carried by rail, the plan says.

The plan suggests that travel by rail should also yield considerable safety benefits. The risk of death is currently 17 times lower in a train than a car or truck, according to the Federal Railroad Administration. A reduction of 74 million fewer vehicle miles traveled (VMT) on highways could eliminate as many as 250 fatalities and 19,000 transportation-related injuries by 2040 in California based on current rates, according to the rail plan.

Rail Passenger Ridership Projection 2040



The plan estimates a nearly 2-to-1 return on rail investment. Nearly \$41 billion of direct investment from private railroads and regional agencies could generate nearly \$77.5 billion in economic benefits by 2040 through new construction, more jobs, and growing tax revenues.

The draft document was prepared with input from passenger rail operators; planning agencies; freight rail interests; tribal nations; private railroads;

transit operators; environmental and agricultural interests, and neighboring states.

The rail plan will still undergo review and is subject to revision. A final plan is expected in 2018. **MM**

Source: Caltrans Rail Planning Branch; Andrew Cook, Branch Chief; Shannon Simonds, Transportation Planner

A Rail Renaissance

The Short-Term Plan (2022)

- Caltrain (Bay Area-Santa Clara commuter line) electrification
- Passenger service expanded to Redlands (San Bernardino County), Salinas (Monterey County) and Larkspur (Marin County)
- Committed rail improvements/extensions
- More bus connections to fill schedule gaps
- Elimination of existing rail freight bottlenecks
- Statewide service planning – connect train routes and schedules

The 10-Year Plan (2027)

- High-Speed Rail — Central Valley to Silicon Valley
- High-Speed Rail service expanded to the San

Francisco Transbay Terminal, Merced, Coachella Valley and Las Vegas

- More frequencies on existing lines using available capacity
- Timed connections between services
- Fully operational integrated ticketing
- Rail freight improvements on shared passenger lines and major trade corridors

The Vision (2040)

- High-Speed Rail — Anaheim to San Francisco by 2029
- Frequent, high-performance rail connections to HSR from Sacramento, Inland Empire, San Diego
- New regional rail system connections to expand the network
- Regular frequencies and fast services



SB 1 Repair Projects Pick Up Speed

More Than \$5 Billion in Expedited Construction Statewide Has Been Approved

The California Transportation Commission agreed in October to speed up 90 construction projects worth about \$3.4 billion, bringing the total approved for accelerated work to more than \$5 billion under the Road Repair and Accountability Act of 2017, or Senate Bill 1. SB 1 is expected to generate more than \$54 billion over the next decade for state and local transportation projects.

The projects are located throughout the state and vary in cost, from a \$2.5 million repainting of a portion of a bridge on State Route 33 in Ventura County to a \$339 million upgrade of shoulders, ramps and 116 miles of Interstate 10 in Riverside County.

Other expedited large projects include an almost \$136 million refurbishing of 25.4 miles of Interstate 5 between Dunsmuir and Mount Shasta; a \$247.2 million bridge project on I-5 in Sacramento; and nearly \$130 million for improving U.S. Highway 101 in Monterey County.

The law will effectively double maintenance dollars for state highways transportation. Cities and counties, also in line for a doubling of their transportation funds under SB 1, can use that money for basic maintenance, rehabilitation and critical safety projects on local streets and roads.

The [Rebuilding California](#) website offers an interactive map of SB 1-funded projects through the state.



Roads in need of repair such as Highway 113 in Yolo County will be fixed sooner after the CTC agreed to expedite pavement repair projects.

The law also emphasizes the importance of accountability and transparency in the delivery of California's transportation projects. Cities and counties must annually highlight progress on projects funded by SB 1, and the process will be overseen by an independent Inspector General.

The law will enable Caltrans to fix more than 17,000 lane miles of pavement, 500 bridges and 55,000 culverts by 2027. The department also will fix 7,700 traffic operating systems, such as ramp meters, traffic cameras and electric highway message boards that help reduce highway congestion. **MM**

Accelerated Projects

Improving or replacing **66** bridges

Improving nearly **1,200** lane miles of pavement on highways across the state

Repairing more than **300** culverts and drainage systems

Installing nearly **2,400** elements that are part of Caltrans' traffic management systems to manage traffic and reduce congestion.

Source: Caltrans Office of Public Affairs

Ready to Chop, Chip, Blast Away Winter

Memory of Last Season's Deluge Fresh, Caltrans Crews Ready for Battle Again

Caltrans has bulked up its defenses for the coming winter as it continues to deal with the aftermath of last season's weather onslaught.

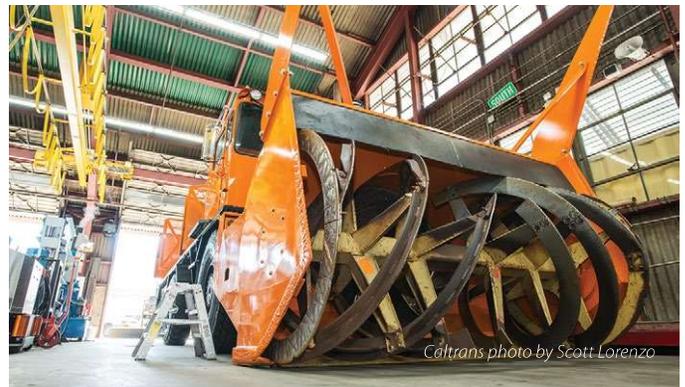
Winter 2017 battered California, and the State Highway System. Fierce storms dumped a mind-boggling 63 feet of snow in parts of the Sierra Nevada, washed out a portion of Highway 50 east of Sacramento, ruined a bridge in Big Sur, triggered a landslide along Highway 1 so massive that it altered the coastline, and unleashed a torrent of mudslides in Southern California.

Damage to state and local roadways from last winter's storms in California totaled more than \$1.46 billion through December — and estimates continue to climb. The number of damaged sites on state highways reached 431; 338 of those required “director's order” declarations to authorize the immediate hiring of contractors to begin repair work. The amount of money spent on those emergency repairs topped \$920 million.

To get ready for this season, Caltrans staff beefed up its winter-busting arsenal and performed considerable maintenance work. Crews cleared debris from pipes and culverts, stabilized slopes and banks, tuned up equipment, and stocked up on de-icing materials.

Last winter, Caltrans deployed a new generation of ice-melting equipment called an Epoke spreader, which treats highways with a less-abrasive ice-melting brine solution. Also, two “pusher” trucks will again be available to assist big rigs that lose traction on Interstate 80 when icy weather descends.

Winter 2017-2018 brings a new addition to the winter-preparation toolbox — a self-propelled personnel hoist with a reach of 83 feet. With it, maintenance workers can inspect and repair bridges, and perform emergency tree trimming in all weather conditions. The all-terrain vehicle can be operated by a driver, or remotely. It can be positioned on un-



Caltrans photo by Scott Lorenzo

The arrival of storm season means extra duties for Caltrans' mechanics who must tune up the arsenal of snow-fighting equipment.

even surfaces, and allows repairs in areas that crews have a hard time reaching.

Big to-do list for cold-weather prep

Keeping more than 1,200 plows, almost 200 graders and myriad other equipment working during winter is a daunting task. The Department's 342 mechanics throughout the state serviced nearly 2,000 pieces of equipment in preparation for winter. The Division of Equipment creates service requests for each piece of equipment that needs work, which makes jobs easier to track.

On the to-do list: Mechanics in Caltrans main equipment shop in Sacramento spent weeks refurbishing eight huge diesel-powered snow blowers, which can blast up to 5,000 cubic tons of snow per hour off roadways. Mechanics refurbished blower boxes, engines, and hydraulic and electrical systems, and applied fresh paint.

Keeping the freeways passable during heavy rain and snow is a challenge. Crews work around the clock during snowstorms, which requires an army of workers. Typically, the Maintenance Division has about 3,000 field employees who can be called upon

to respond to weather-related events at any one time. About 600 seasonal workers are bolstering the cold-weather work force, although an improved economy, coupled with a wave of retirements, is making it harder to find seasonal help.

Maintenance also has added five ice breakers to its fleet, bringing to nine the number of these machines that chew up snow and clear icy debris off roads. Caltrans also has brought in six brine-making systems used in the de-icing process in Caltrans' regional districts that deal with snow in the Northern and Central Sierra. These systems melt roadway ice in a less abrasive and more environmentally-friendly manner.

By late summer to early fall, Caltrans districts in snowy regions are stocked with equipment and materials to respond to the upcoming winter weather conditions.

Higher elevation strategies

Caltrans is in the process of replacing aging avalanche-control equipment in high-altitude sections

of Districts 3 (Sacramento-northern Sierra), 9 (Inyo/Mono counties) and 10 (Stockton-central Sierra). Strategically placed in avalanche zones, these “cannons” — some of which were designed specifically for the Department — use a mixture of propane and oxygen to unleash a controlled avalanche to reduce the risk of a dangerous uncontrolled event later.

After last winter's deluge, Caltrans is adding to the supply of machines that drain debris from pipes and drains, and is making tips on “weathering the storm” available to the public. The Department also distributed winter preparedness reports to district offices. These checkoff lists are reminders to district staff about winter procedures, and provide useful contact information. **MM**

Source: Russell Modrell, Branch Chief, Winter Operations; Virgil F. Realin, Supervising Highway Equipment Superintendent, Office of Maintenance & Repair, Chief, Northern Region; Robert Bickor, Maintenance Superintendent

Panels Deflect Danger

Part of Caltrans' winter preparation in the central Sierra Nevada involves fine-tuning “jet roofs” — metal panels carefully positioned on snowy summits to redirect wind and prevent the formation of overhanging slabs of ice. If allowed to form, these deposits pose a danger to passing motorists if dislodged.

A jet roof acts as an aerodynamic structure, placed on the crest of a ridge where snow buildups known as cornices form on the leeward side. Supported by angled iron legs and staked to the ground, the 10 foot-by-10 foot panels direct wind downward, discouraging such formations.

Caltrans maintains 142 of these structures along the ridge lines above Highway 88, in an avalanche-prone area known as the Carson Spur. Caltrans also maintains 65 wind fence installations, each 8 feet by 10 feet, on the windward side of lower passes near the Kirkwood Ski Resort. The total length of the system protects .63 miles of exposed ridge line from cornice buildup.



Metal panels called “jet roofs” line a section of a Central Sierra ridge above Highway 88 to keep potentially deadly cornices from forming.

District 10 Maintenance crews inspect the jet roof stock every summer. Because the climate is inhospitable during the winter months, wear and tear is expected. This year, 23 units required repairs, such as new legs, wires or metal panels, or, in some cases, entire replacement.

Heavy snow and howling winds last winter season buried and crushed sections of jet roofs. High winds can wreak havoc if panels aren't kept in tip-top shape.



Although pavement, bridges and culverts are the most obvious parts of Caltrans' inventory of highway "assets," displays such as this electronic message board on Highway 80 in the Bay Area also are vital to the functioning of the state highway system. SB 1 requires Caltrans improve a set number.

TAMP Ramps Up Caltrans Expectations

Transportation Asset Management Plan Takes Inventory, Sets Performance Goals

What it will take to keep the world's sixth largest economy and more than 40 million residents moving on California's vast transportation system is at the heart of the draft [California Transportation Asset Management Plan](#) (TAMP).

The TAMP offers a present-day assessment of the system's many physical parts, but also sets ambitious performance goals as a new era in transportation beckons in California with passage of Road Repair and Accountability Act of 2017 (Senate Bill 1).

The asset management plan is required by state law and federal regulations. The product of internal and stakeholder input, the plan is Caltrans' most comprehensive effort to date to inventory California highway "assets" — the critical components that make up the state and federal transportation network. The plan assesses the condition of those resources, and projects the costs of protecting, managing and ultimately improving the state's pavement, bridges, drainages, and traffic management systems.

To reach "state of good repair" objectives over the next 10 years, the TAMP lays out a range of performance targets for California's highway infrastructure. The plan highlights stark differences in future highway conditions with and without SB 1 funding.

The improvement effort will require a massive financial commitment, the TAMP acknowledges, but it projects that SB 1 revenues will put California on track to meet those targets. Almost \$2.7 billion is expected to be raised yearly through 2027 for state transportation purposes.

The assets on two overlapping highway systems are examined: the State Highway System (SHS) and the National Highway System (NHS). The SHS is the highway system managed by Caltrans that includes all interstate and state highways. The NHS includes portions of the SHS, as well as roads and bridges managed by California cities' and counties' transportation agencies. Roads on the NHS are defined by the FHWA to be important to the nation's economy, defense and mobility.

Caltrans' asset management approach attempts to strike a balance between reconstructing parts of the transportation system in poor condition, and preserving those in good condition to prevent costly deterioration.

Caltrans' asset management approach attempts to strike a balance between reconstructing parts of the transportation system in poor condition, and preserving those in good condition to prevent costly deterioration. This strategy extends the useful lives of the state's transportation assets and is more cost-effective in the long run compared with replacement of badly damaged structures.

In addition, asset management strategy calls for highway infrastructure investments based on total life-cycle cost estimates, from design to upkeep. 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.



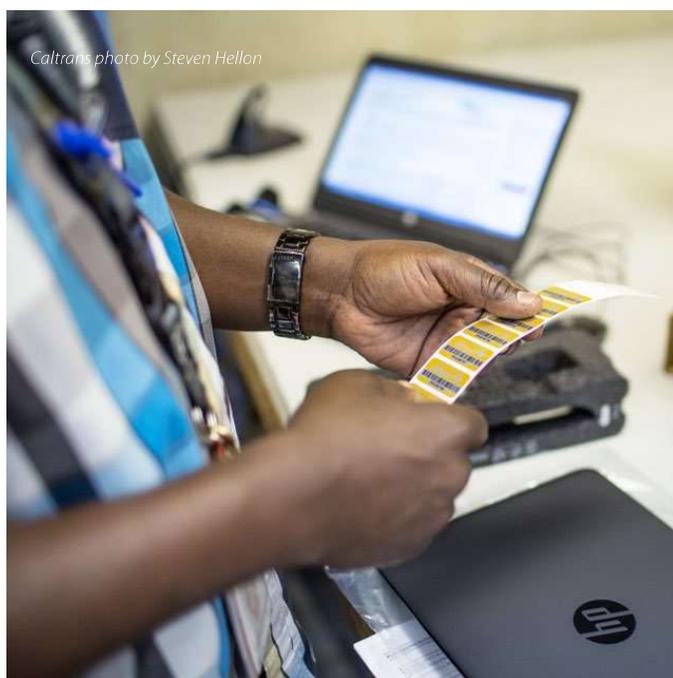
Sections of pipe that will become new culverts are lined up in a Caltrans yard. Drainage upgrades are high on the SB 1 fix-it list.

Much of the TAMP's conclusions are based on Caltrans' 2017 State Highway Management Plan, which redefined the way highway projects would be selected and funded. That plan adopted a good/fair/poor rating system for all highway assets that was used in the TAMP, and that classification standard will continue to measure progress toward SB 1 performance goals.

In addition to Caltrans' major asset classes — pavement, bridges, culverts and transportation management systems — the TAMP also evaluates nine other types of infrastructure, such as office buildings, roadside rest facilities and weigh stations.

Throughout the process of developing the California TAMP, workshops were held with stakeholders that are responsible for parts of the NHS. The TAMP process and the development of asset management performance targets on the SHS and local NHS systems to evaluate scenarios and financial investments was an opportunity to improve coordination across agencies to deliver a better transportation system and experience to Californians.

The final version of the TAMP will be submitted to the California Transportation Commission for approval, then undergoes FHWA review in April 2018 for compliance with federal requirements.



At a Caltrans warehouse, a worker readies ID labels that will be affixed to new traffic management system components on highways.

Source: Caltrans Office of Public Affairs

Landmark Road Fix Tops List of New Laws

Passage of SB 1 in April Kicked Off an Active Year for Transportation Legislation

The 2016-17 California legislative session saw the passage of the most far-reaching and significant transportation funding bill in decades, the Road Repair and Accountability Act of 2017, Senate Bill 1. The new law, signed by Gov. Edmund G. Brown Jr. in April, raised fuel taxes on Nov. 1 and will impose road improvement fees for most vehicles beginning Jan. 1, 2018 to fix the state's immense backlog of needed repairs to its transportation system.

A brief description of SB 1 and associated bills, and other transportation-related legislation that became law follows:

Senate Bill 1 (*Beall*) — Road Repair and Accountability Act of 2017

This bill invests \$5.4 billion per year to fix roads, freeways, and bridges in communities across California. These funds will be split equally between state and local investments. The bill puts additional funds toward transit systems, active transportation to encourage pedestrian and bicycle travel, and freight mobility, and includes reforms and accountability measures.

Assembly Bill 115 (*Committee on Budget*) — SB 1 budget trailer bill

This is a budget trailer bill and provides technical clarifications for SB 1, various contracting and procedural flexibilities for local governments to implement SB 1, and an extension of Caltrans' Contract Manager/General Contractor contracting authority because of the expanded work required by SB 1.

SB 103 (*Committee on Budget and Fiscal Review*) — SB 1 budget trailer bill

This bill is a follow-up to SB 1, providing more detail for Caltrans' advance mitigation program, freight corridor program, and small business and diversity efforts in



Caltrans photo by Scott Lorenzo

Gov. Edmund G. Brown Jr., accompanied by Senate Pro Tem Kevin de León at right and other lawmakers, heralded the fulfillment of his longtime goal to find funding to fix California's crumbling roads.

contracting. This bill establishes additional provisions and requirements for Caltrans' Advance Mitigation Program to offset environmental impacts of projects, and creates an Advance Mitigation Account. This bill also revises the requirements applicable to the Trade Corridor Improvement Fund to upgrade major freight routes in California, and makes the requirements applicable to the Trade Corridor Enhancement Account. Further, this bill establishes a small business participation goal in statute and requires outreach to underrepresented groups for contracting and employment.

AB 28 (*Frazier*) — NEPA assignment

This bill extends Caltrans' authority to conduct federal environmental reviews for transportation projects on behalf of the Federal Highway Administration until Jan. 1, 2020.

AB 515 (Frazier) — State Highway System Maintenance Plan

This bill supports Caltrans' shift to an integrated asset management plan by merging the 10 Year State Highway Operation and Protection Program (SHOPP) Plan and the Five Year Maintenance Plan into one overarching State Highway System Maintenance Plan. The bill requires a draft of the plan to be submitted to the California Transportation Commission (CTC) by February 15 of each odd-numbered year, with the final plan submitted to the Governor and the Legislature by June 1.

AB 669 (Berman) — Truck platooning

This bill extends Caltrans' authorization to continue testing advanced cruise control driving technology for commercial trucks through Jan. 1, 2020. The technology that allows freight-carrying trucks to operate at distances less than 100 feet on state highways is intended to improve safety, lower vehicle emissions and save fuel.

SB 605 (Galgiani) — Small business definition

This bill, taking effect Jan. 1, 2019, increases from \$10 million to \$15 million the amount of annual gross receipts that a business may receive and be defined as a small business. The cap is raised to \$36 million specifically for public works projects. The bill also raises the amount for a microbusiness from \$2.5 million to \$5 million.

AB 1218 (Oberholte) — CEQA bicycle exemption

This bill extends California Environmental Quality Act exemptions for bicycle transportation plans and bike lane projects until Jan. 1, 2021. These exemptions are set to sunset on Jan. 1, 2018.

SB 672 (Fuller) — Traffic-actuated signals: motorcycles and bicycles

This bill makes permanent the statutory requirement for new and replacement traffic signals and equipment to detect bicycles and motorcycles. This requirement was set to expire on Jan. 1, 2018.

AB 1282 (Mullin) — Transportation Permitting Task Force

This bill requires the Secretary of the California Transportation Agency to establish a Transportation Permitting Task Force, consisting of representatives from Caltrans, the CTC, Department of Fish and Wildlife, the State Water Resources Control Board, regional water quality control boards, and the California Coastal Commission to streamline environmental permitting so that transportation projects can be delivered more quickly and efficiently. The bill would require the Secretary of Transportation, by Dec. 1, 2019, to prepare and submit to the Legislature a report of the task force's findings. **MM**

Source: Caltrans Legislative Affairs Office

California lawmakers, shown here during the 2016-2017 legislative session, passed a host of bills that will impact the state's transportation system.



Caltrans photo by John Huseby



A Caltrans Maintenance employee pries off concrete from the Maxwell Bridge in Napa that was damaged by a 6.0-magnitude earthquake in August 2014. Based on the quake's intensity, Caltrans' ShakeCast system sent email alerts warning of possible damage to Department structures.

ShakeCast Alert System Becomes Model

Other States May Emulate Quick Response to Quakes; Flood, Fire Use Planned

As its successful [ShakeCast](#) earthquake email alert system becomes a model for other states, Caltrans is developing similar platforms for using real-time data to respond to floods and fires. It's part of Caltrans' efforts to establish an integrated emergency-management system for all types of threats to the State Highway System and its facilities.

Caltrans' ShakeCast was developed in cooperation with the U.S. Geological Survey (USGS) and is now in its third version. It is a web-based application that sends out an alert to Caltrans staff when an earthquake of a certain magnitude occurs. The system identifies bridges and Caltrans buildings most susceptible in an area where an earthquake of certain strength occurs, so inspections for damage can be performed.

More than 12,700 state bridges and facilities statewide are catalogued in the ShakeCast system. There are 568 groups and individuals within Caltrans who receive e-mails within 15 minutes of an earthquake of magnitude 4.0 and greater occurring in Califor-

nia. The Department can then respond quickly to potentially damaging incidents and focus inspection efforts where needed, better protecting the transportation network.

ShakeCast has drawn attention from nine other states that want to adopt their own versions. They are: Washington, Oregon, Idaho, Utah, Texas, Missouri, Oklahoma, Mississippi and South Carolina.

In addition, Los Angeles Unified School District uses ShakeCast to monitor more than 1,000 buildings. In Japan, ShakeCast has been used to check nuclear plants.

Fires and floods also are major threats to the state and its transportation system, and a Caltrans-led effort is using ShakeCast as a guide to create FloodCast and FireCast applications — both of which are under development.

Working with the federal advisory Transportation Research Board, FloodCast is about two-thirds through the development process. The system would use data from Caltrans, USGS, National Weather Ser-

vice and National Oceanic and Atmospheric Administration (NOAA) to help predict where floods are likely to occur, and guide deployment of response resources. FloodCast could be in operation within two years.

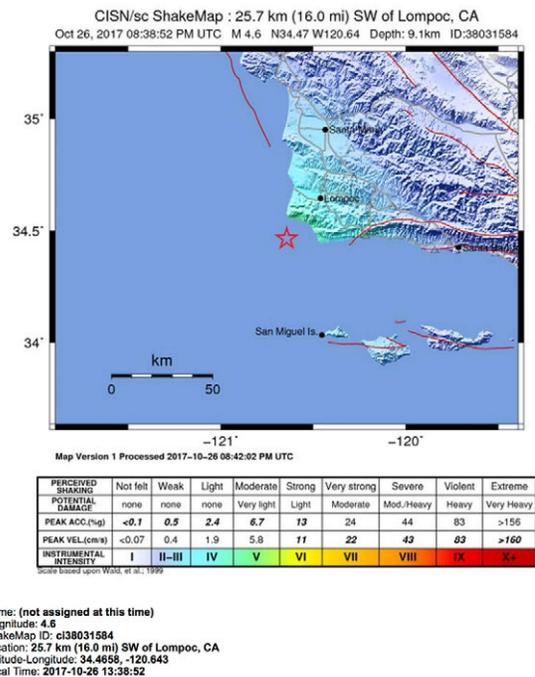
Similarly, FireCast would help predict where wildfires, such as those that devastated Napa, Sonoma and Mendocino counties in October 2017, might occur. The development of FireCast is in its infancy, although it's already operating at a basic level — a daily rating of fire dangers sent to Caltrans field staff.

Eventually, it's expected that FireCast will project the path of blazes along the State Highway System to better warn field staff and the public. It's intended to help guide where equipment should be staged and what roads should be closed.

Information from FireCast could be incorporated into FloodCast to predict locations of post-fire floods or mudslides, and set off email notifications such as those issued for ShakeCast.

ShakeCast sends “new event” emails for all earthquakes greater than 4.0 within California. ShakeCast has reported more than 300 earthquakes in the last decade. Though felt by many and reported by media, the vast majority did not produce enough shaking to damage Caltrans structures.

ShakeCast Email Alert



ShakeCast identifies Caltrans' bridges and buildings that could potentially be affected by earthquakes stronger than 4.0 in California. This helps the Department guide the deployment of resources.



Caltrans photo by John Huseby

Caltrans repaired parts of the Maxwell Bridge over the Napa River after pieces of concrete cracked and fell during a 2014 temblor.

However, several generated enough shaking to trigger secondary “potential impact” notifications. These messages identify bridges and buildings where ground movement was severe enough to warrant response. In each, damage to bridges was observed. Those earthquakes were:

- 2014: 6.0-magnitude Napa earthquake
- 2010: 7.2-magnitude Calexico earthquake
- 2008: 5.4-magnitude Chino Hills earthquake

ShakeCast, FloodCast and FireCast will expand the range of Caltrans' responses to natural disasters, but staff at the Department's Emergency Management Division aren't stopping there. They're already starting work on SnowCast. **MM**

Sources: Rene T. Garcia, Branch Chief, Homeland Security, Office of Emergency Management and Infrastructure Protection; Loren L. Turner, Office Chief, Director's Office of Asset Management; Herby Lissade, Chief, Office of Emergency Management

Unspent Highway Dollars Steered Here

For Meeting Deadlines, State Reaps \$274.5 Million in Federal Redistribution Funds

California was again rewarded in its pursuit of federal transportation dollars this year, scooping up \$274.5 million in the “August Redistribution” to be split between Caltrans and local transportation agencies.

It’s the second year in which California collected more than \$200 million from a pot of money returned by states that are unable to use all of their assigned federal funds in the previous fiscal year. The pool of money for 2016-2017 totaled almost \$3.14 billion.

To receive a share of the redistributed money, states must show the Federal Highway Administration that funds are needed to satisfy transportation-related purposes, and submit a list of projects ready to go. California has been aggressive — and successful — in applying for federal redistribution funds, ranking at or near the top of the list each year.

California’s receipt of \$274.5 million was just short of last year’s record \$293 million. Texas received the most redistribution money this year with \$280 million, followed by California, Florida (\$158.6 million), Pennsylvania (\$153.9 million), and New York (\$145.3 million).

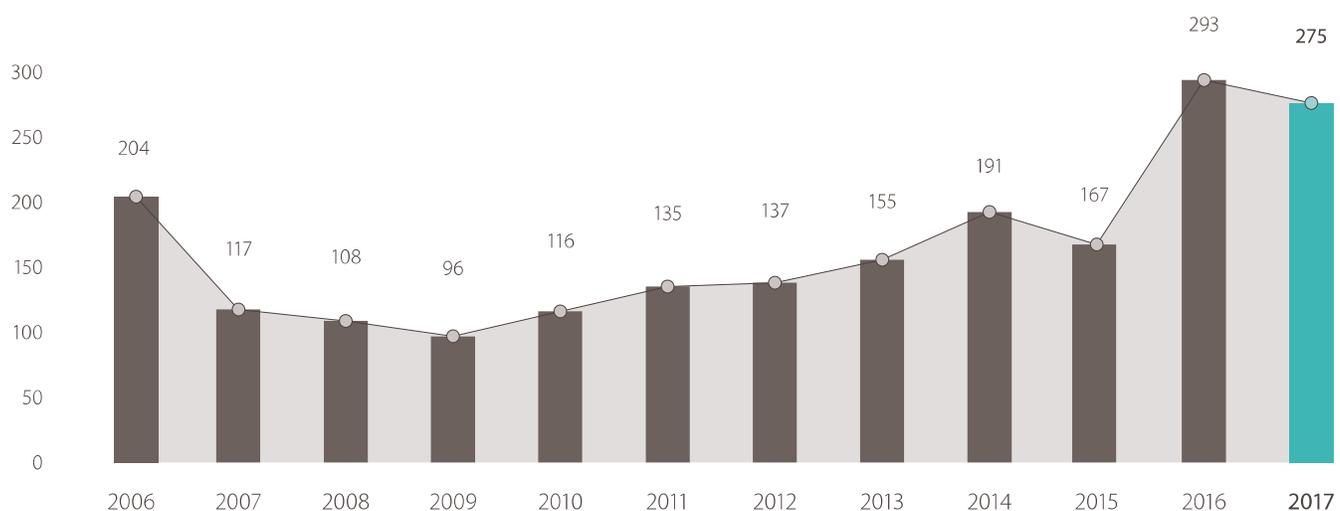
Altogether, California has collected about \$2.3 billion from the redistribution program since 2000.

Caltrans passes along about 40 percent of the redistribution amount to local agencies with transportation projects waiting or underway. Of the \$274.5 million due California, the local share is expected to be between \$100-\$110 million.

In Caltrans’ case, much of the federal money will additional highway pavement and bridges repairs. **MM**

Source: Steven Keck, Chief, Caltrans Division of Budgets

August Redistribution to California by Year (in millions of dollars)



From the Archives

A planting project on a section of the Hollywood Freeway (part of U.S. 101) was a major undertaking in June 1960. The strip being landscaped was in the Cahuenga Pass area, just north of what is now Universal Studios. Note the mileage sign in which the distances are given in decimals. The planted strip still exists today. Photo by Sat Yoshizato

