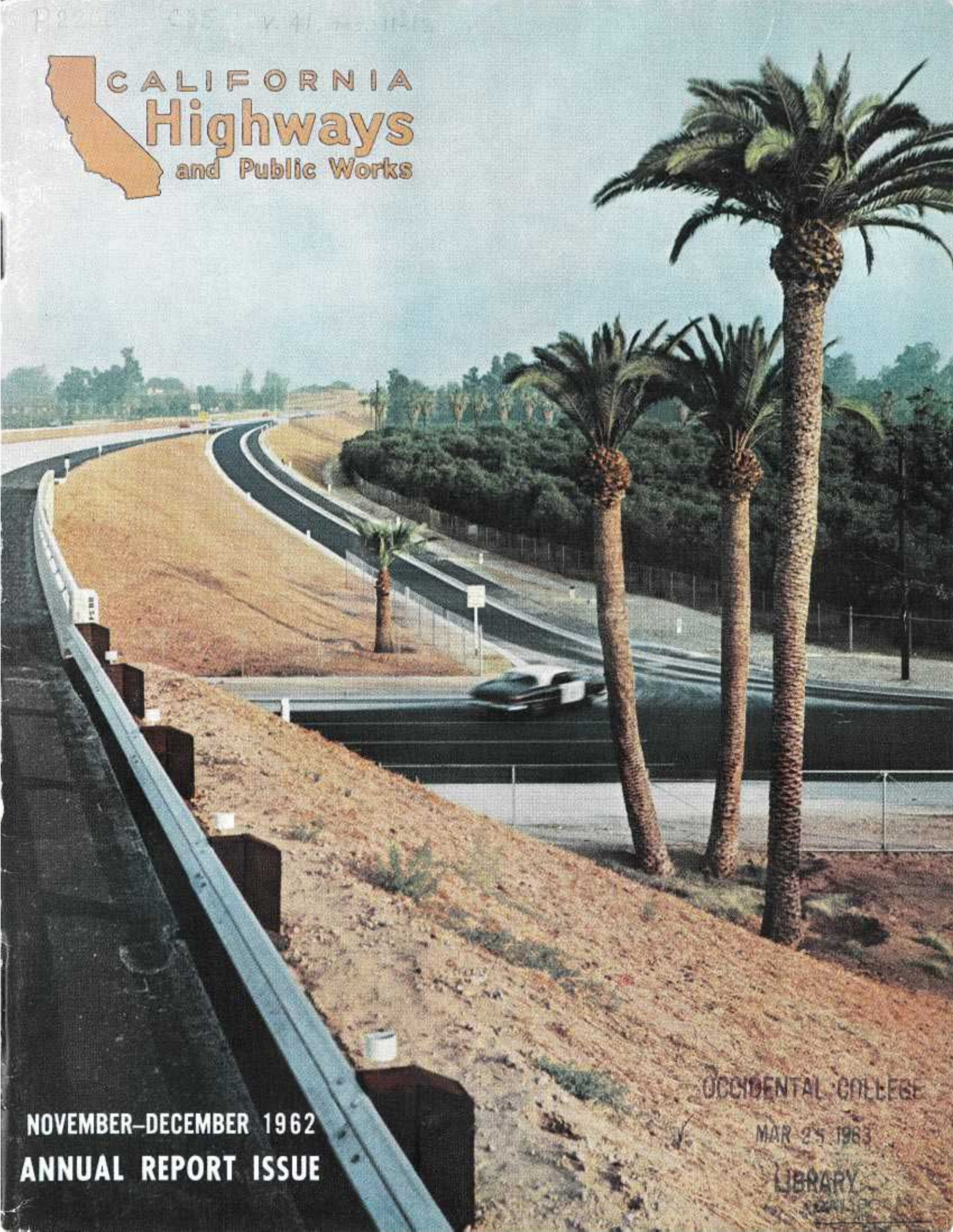




CALIFORNIA  
**Highways**  
and Public Works



NOVEMBER-DECEMBER 1962  
ANNUAL REPORT ISSUE

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# Letters of Transmittal

December 4, 1962

December 4, 1962

EDMUND G. BROWN  
Governor of California

My Dear Governor:

It is a pleasure to submit to you the 16th Annual Report of the Division of Highways, Department of Public Works. The report presents an overall view of the California highway program for the 1961-62 fiscal year, and gives a broad picture of the steady progress which is being made to improve motor vehicle transportation facilities for our rapidly growing population.

The end of 1962 finds California first among the states in many other respects as well as population.

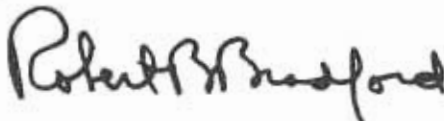
One of the principal areas of California's pre-eminence is in providing modern, toll-free multilane divided highways. We now have nearly 2,600 miles of these facilities in operation and an additional 350 miles under construction, most of the latter being of the full freeway type.

This leadership in modern highway construction is the result of long-time leadership in highway planning, crystallized in 1959 with the enactment of the 20-year freeway and expressway system master plan signed into law by you. More than half of the route location mileage for this 12,400-mile system, which includes California's 2,178-mile portion of the interstate system, has now been adopted by the California Highway Commission.

Effective planning is being continued and strengthened. State-local co-operation is being emphasized in freeway planning and design, including increasing attention to scenic and esthetic qualities as well as other community values. The relatively few locations involving some appreciable degree of controversy may make headlines, but the vast majority of the nearly 2,000 miles of routings adopted during the past four years have been worked out in harmony with local authorities. Many of these sections have involved complex location problems in urban areas.

This continuing highway progress is paying huge dividends in safety as well as mobility. It is reliably estimated that our present completed mileage of full freeways is saving over 300 lives a year in California, on the basis of comparison with accident statistics for the inadequate transportation arteries which the freeways have replaced. This saving of life and limb is one of our most significant accomplishments and, I know, the most gratifying to you personally.

Respectfully,



ROBERT B. BRADFORD  
Director of Public Works

ROBERT B. BRADFORD  
Director of Public Works  
State of California

Dear Sir:

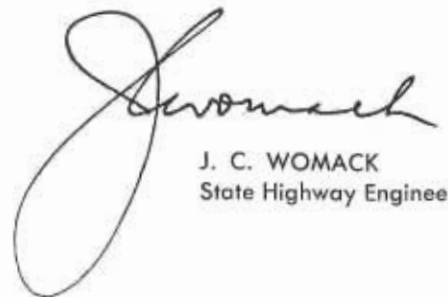
Submitted herewith for your approval and transmittal to Governor Edmund G. Brown is the 16th Annual Report of the Division of Highways.

This report is prepared in compliance with Section 143 of the Streets and Highways Code and generally covers the fiscal year ending June 30, 1962. Some later information on the construction program is included, as is the State Highway Budget for fiscal 1963-64 as adopted by the California Highway Commission on October 19, 1962.

The fruits of long-range planning and orderly construction on the state freeway and expressway system, including those routes included in the national system of interstate highways, are becoming increasingly evident. In 1962 more than 150 new miles of full freeway were opened to traffic, an increase of about one-third over the freeways opened in 1961. More than 50 miles of freeway were opened in the Los Angeles district alone, including the long-awaited downtown freeway loop. More than 350 additional miles of freeway are under construction.

At the same time construction is proceeding on other highway improvements throughout the State, as rapidly as available funds permit, in a continuing effort to attain a balanced program of meeting traffic needs.

Continuing the practice initiated in 1960, the text and illustrated portion of the annual report is again included in our bimonthly magazine, *California Highways and Public Works*. Financial statements, apportionment tables, contract statistics and miscellaneous other data will be published separately in a Statistical Supplement. This supplement is available to interested persons on request.



J. C. WOMACK  
State Highway Engineer

# California Highways and Public Works

Official Journal of the Division of Highways, Department of Public Works, State of California

Vol. 41

November-December 1962

Nos. 11-12

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FRONT COVER—Part of the freeway through Redlands on U.S. 70-99 (Interstate 10) at the Cypress Avenue Undercrossing, completed in August 1962. The golden straw on the embankments provides erosion protection pending planting of trees, shrubs and periwinkles. The palm trees were transplanted to their present location (photo by Robert Dunn).

BACK COVER—Looking west along Carquinez Strait, with the new Benicia-Martinez Toll Bridge just west of the movable-span Southern Pacific railway bridge in foreground. City of Benicia at north end of bridge; Carquinez Bridge in far background (photo by Robert Rose).



LESTER S. KORITZ, *Editor*

STEWART MITCHELL, *Associate Editor*    JOHN C. ROBINSON, *Associate Editor*  
WILLIAM R. CHANEY, *Chief Photographer*

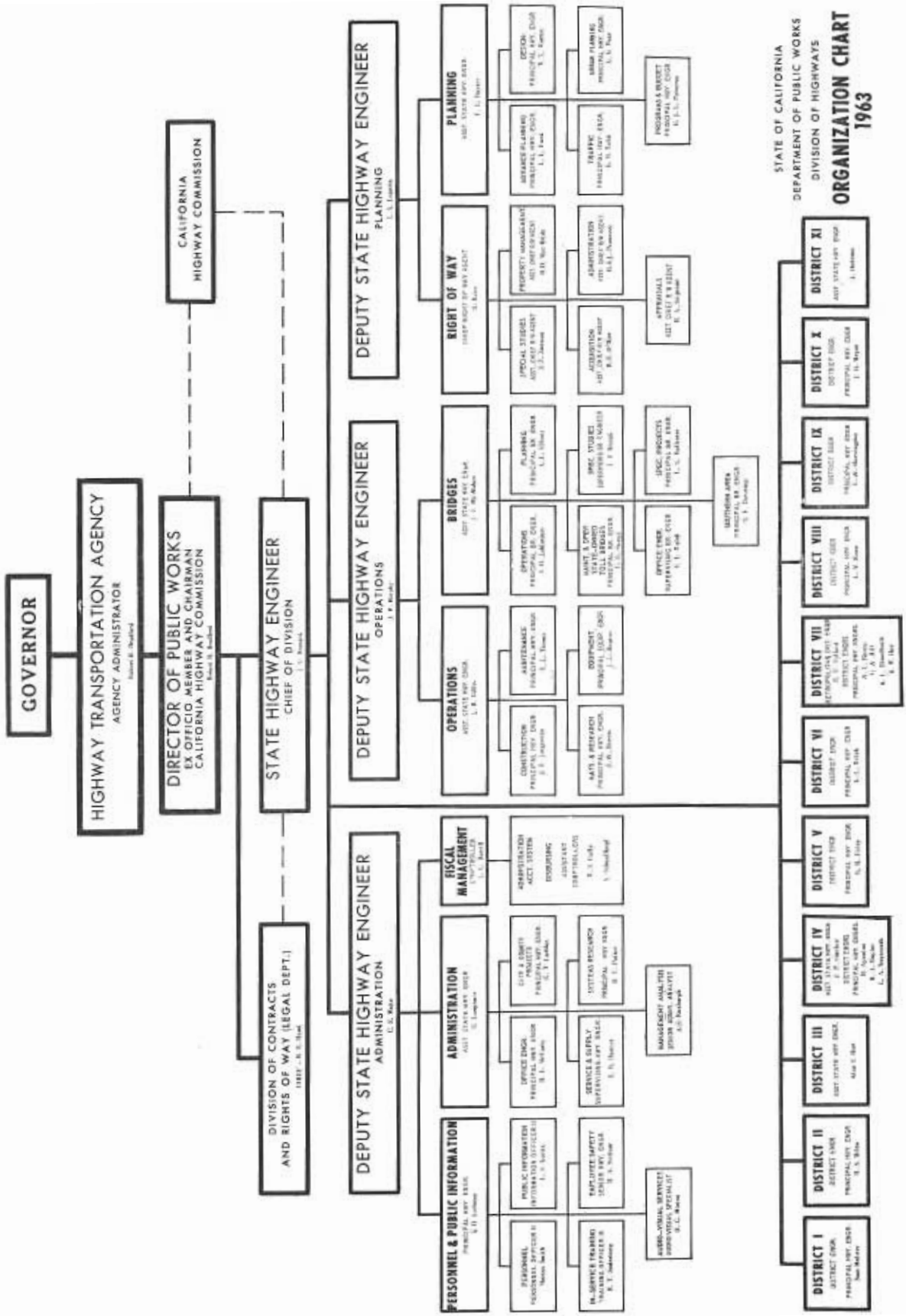
*Editors are invited to use information contained herein and to request prints of any black and white photographs.*

*Address communications to: EDITOR,*

**CALIFORNIA HIGHWAYS AND PUBLIC WORKS**

P. O. Box 1499

SACRAMENTO, CALIFORNIA





STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC WORKS

CALIFORNIA HIGHWAY COMMISSION

ROBERT B. BRADFORD, Chairman, Ex Officio

Member	Residence	Date of original Appointment	Term Expires
JAMES A. GUTHRIE	San Bernardino	September 14, 1943	January 15, 1965
ARTHUR T. LUDDY	Sacramento	February 16, 1959	January 15, 1963
ROGER S. WOOLEY	San Diego	March 18, 1959	January 15, 1963
JOHN ERRECA	Los Banos	January 15, 1961	January 15, 1965
ABRAHAM KOFMAN	San Jose	September 14, 1961	January 15, 1964
FRANKLIN S. PAYNE	Los Angeles	February 3, 1962	January 15, 1966

Secretary: A. J. COOPER

Assistant Secretary: G. N. COOK (Retired February 1, 1962)

Assistant Secretary: ROBERT T. MARTIN

CALENDAR OF MEETINGS

CALIFORNIA HIGHWAY COMMISSION

July 1, 1961, to June 30, 1962

July 26, 1961	Los Angeles	December 14, 1961	Sacramento
(Public hearing on freeway location, road VII-Ora-43-B, between 1.4 miles west of Route 176 and 2.3 miles east of Route 176.)		(Special public hearing with respect to the effect of the north-south freeway in the City of Sacramento on the historical sites involved, road III-Sac-238-Sac.C.)	
*July 26 and 27, 1961	San Diego	January 24, 1962	Sunnyvale
		(Special session for inspection of highway projects in Santa Clara, San Mateo and San Francisco Counties.)	
*August 23, 1961	Oakland	*January 25, 1962	Sacramento
*August 24, 1961	San Francisco	February 19, 1962	Lakeport
August 25, 1961	San Francisco	(Public hearing on freeway location, road I-Lak-89-D, between 1 mile south of Kelseyville and the Junction of Route 16.)	
(Public hearing on freeway location, road IV-SF-253-SF, between Evans Avenue and Route 224 at Howard Street.)		*February 20 and 21, 1962	Sacramento
September 15, 1961	Monterey	March 27, 1962	Los Angeles
(Special session for inspection of freeway route on road V-Mon-56-H, I-Mon,SndC,Sea, between Carmel River and Fort Ord. Met with officials from this area in a discussion of freeway development of above-mentioned section of State highway.)		(Public hearing on proposed relocation of road VII-LA-161-Pas, between Kensington Place and Lincoln Avenue, and road VII-LA-9-Pas,E,Ada, between Lincoln Avenue and 1,500 feet east of Michillinda Avenue.)	
*September 27 and 28, 1961	Sacramento	*March 28, 1962	Los Angeles
September 29, 1961	Mammoth	March 30, 1962	Los Angeles
(Public hearing on freeway location, road IX-Mno-23-C,D, between Whisky Canyon and 1.8 miles north of McGee Creek.)		(Special session for inspection of highway projects in the Los Angeles Metropolitan Area, and dedication ceremonies on the completion of the Los Angeles Freeway Loop.)	
October 24, 1961	Santa Monica	*April 25, 1962	Sacramento
(Special session for inspection tour of freeways in the Los Angeles area.)		May 17, 1962	Sacramento
*October 25 and 26, 1961	Santa Monica	(Public hearing on freeway location, road III-Sac-238-A, Sac, Legislative Route 238 (West Side Freeway) between 0.8 mile south of Freeport and 0.5 mile south of Broadway in the City of Sacramento.)	
October 31, 1961	King City	May 18, 1962	Sonora
(Public hearing on proposed relocation of road V-Mon-2-H,G,F,KnC,E, between 1.9 miles south of San Ardo and 1.6 miles north of King City.)		(Public hearing on proposed relocation of road X-Tuo-40, 65-A,B,B, between Yosemite Junction and Groveland, required by proposed construction of New Don Pedro Dam and Reservoir.)	
*November 15 and 16, 1961	Sacramento	May 22, 1962	Los Angeles
November 17, 1961	Menlo Park	(Special session for inspection of highway construction activities of San Diego as part of National Highway Week, and inspection of roads in Los Angeles, San Bernardino, and Riverside Counties.)	
(Public hearing on freeway location, road IV-SM,SCL-107-MIP,B,PA,A, between Santa Cruz Avenue and the Dumbarton Bridge.)		*May 23, 1962	Los Angeles
December 12, 1961	Sonoma	*June 26, 1962	Los Banos
(Public hearing on freeway location, road IV-Son-8,51-A, B;A,B,Son, between Sears Point, the Napa county line and Kenwood.)			
*December 13, 1961	Sacramento		

\* Regular meetings.

November-December, 1962

PAST MEMBERS OF THE CALIFORNIA HIGHWAY COMMISSION

Name	Residence	Date of appointment	Termination of membership
Burton A. Towne*	Lodi	Aug. 2, 1911	Resigned Jan. 14, 1914
Charles D. Blaney*	Saratoga	Aug. 2, 1911	Resigned Mar. 1, 1917
N. D. Darlington*	Los Angeles	Aug. 2, 1911	Resigned Jan. 8, 1923
Charles F. Stern	Eureka	Jan. 15, 1914	Resigned Dec. 21, 1918
Henry J. Widenmann*	Vallejo	Mar. 1, 1917	Died Oct. 6, 1918
Charles A. Whitmore*	Visalia	Nov. 29, 1918	Resigned Jan. 8, 1923
Emmett Phillips*	Sacramento	Dec. 21, 1918	Died June 18, 1919
George C. Mansfield*	Oroville	June 24, 1919	Resigned Jan. 9, 1923
Harvey M. Toy*	San Francisco	Jan. 9, 1923	Resigned Jan. 3, 1927
Louis Everding*	Arcata	Jan. 9, 1923	Resigned Jan. 17, 1927
Nelson T. Edwards*	Orange	Jan. 10, 1923	Resigned Jan. 3, 1927
Ralph W. Bull*	Eureka	Jan. 6, 1927	Resigned Jan. 6, 1931
J. P. Baumgartner*	Santa Ana	Jan. 6, 1927	Resigned Jan. 6, 1931
M. B. Harris*	Fresno	April 18, 1927	Resigned Jan. 6, 1931
Joseph N. Schenck*	Los Angeles	Aug. 19, 1927	Resigned Jan. 6, 1931
Fred S. Moody*	San Francisco	Aug. 19, 1927	Resigned Jan. 6, 1931
Earl Lee Kelly*	Redding	Jan. 6, 1931	Died Nov. 1, 1962
Frank A. Tetley*	Riverside	Jan. 6, 1931	Resigned July 31, 1935
Timothy A. Reardon*	San Francisco	Jan. 6, 1931	Resigned May 7, 1936
Harry A. Hopkins*	Taft	Jan. 6, 1931	Resigned Oct. 14, 1937
Philip A. Stanton*	Anaheim	Jan. 6, 1931	Resigned Mar. 3, 1939
Dr. W. W. Barham	Yreka	Dec. 20, 1932	Resigned May 21, 1935
Ray Ingels	Ukiah	May 21, 1935	Resigned Oct. 4, 1935
C. D. Hamilton*	Banning	Aug. 1, 1935	Died April 24, 1936
H. R. Judah*	Santa Cruz	May 7, 1936	Resigned Oct. 5, 1937
Paul G. Jasper*	Fortuna	May 7, 1936	Resigned Mar. 3, 1939
William T. Hart*	Carlsbad	July 7, 1936	Resigned Mar. 3, 1939
Robert S. Redington	Los Angeles	Oct. 5, 1937	Resigned Jan. 27, 1939
Frank W. Clark	Los Angeles	Jan. 27, 1939	Resigned Mar. 10, 1939
Lawrence Barrett	San Francisco	Mar. 3, 1939	Resigned Jan. 11, 1943
Iener W. Nielsen	Fresno	Mar. 3, 1939	Resigned Jan. 11, 1943
Amerigo Bozzani	Los Angeles	Mar. 3, 1939	Resigned Jan. 11, 1943
Bert L. Vaughn	Jacumba	Mar. 3, 1939	Resigned Jan. 11, 1943
L. G. Hitchcock	Santa Rosa	Mar. 10, 1939	Resigned Jan. 11, 1943
Gordon H. Garland†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
Mrs. Dora Shaw Heffner†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
Miss Helen MacGregor†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
Verne Scoggins†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
William Sweigert†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
C. Arnholt Smith	San Diego	Sept. 14, 1943	Resigned Jan. 1, 1949
C. H. Purcell*	Sacramento	Sept. 14, 1943	Resigned July 31, 1951
Homer P. Brown*	Placerville	Sept. 14, 1943	Resigned Oct. 26, 1951
Harrison R. Baker	Pasadena	Sept. 14, 1943	Jan. 15, 1954
Charles T. Leigh	San Diego	May 11, 1949	Jan. 15, 1955
F. Walter Sandelin	Ukiah	Sept. 14, 1943	Jan. 15, 1956
Frank B. Durkee	Sacramento	Aug. 4, 1951	Resigned Dec. 31, 1957
H. Stephen Chase	San Francisco	Oct. 30, 1951	Resigned Feb. 25, 1958
Fred W. Speers	Escondido	Jan. 21, 1955	Jan. 15, 1959
C. M. Gilliss	Sacramento	Jan. 1, 1958	Resigned Nov. 10, 1958
John O. Bronson	Sacramento	Feb. 26, 1958	Jan. 15, 1959
T. Fred Bagshaw	Mill Valley	Nov. 10, 1958	Resigned Jan. 4, 1959
Robert L. Bishop	Santa Rosa	Jan. 15, 1956	Jan. 15, 1960
Chester H. Warlow	Fresno	Sept. 14, 1943	Jan. 15, 1961
John J. Purchio	Hayward	Jan. 15, 1960	Resigned Sept. 9, 1961
Robert E. McClure	Santa Monica	Jan. 18, 1954	Jan. 15, 1962

\* Deceased.  
 † Member of the Interim Commission.



# California

## Highways....1962

As 1962 ends, California is the nation's most populous state.

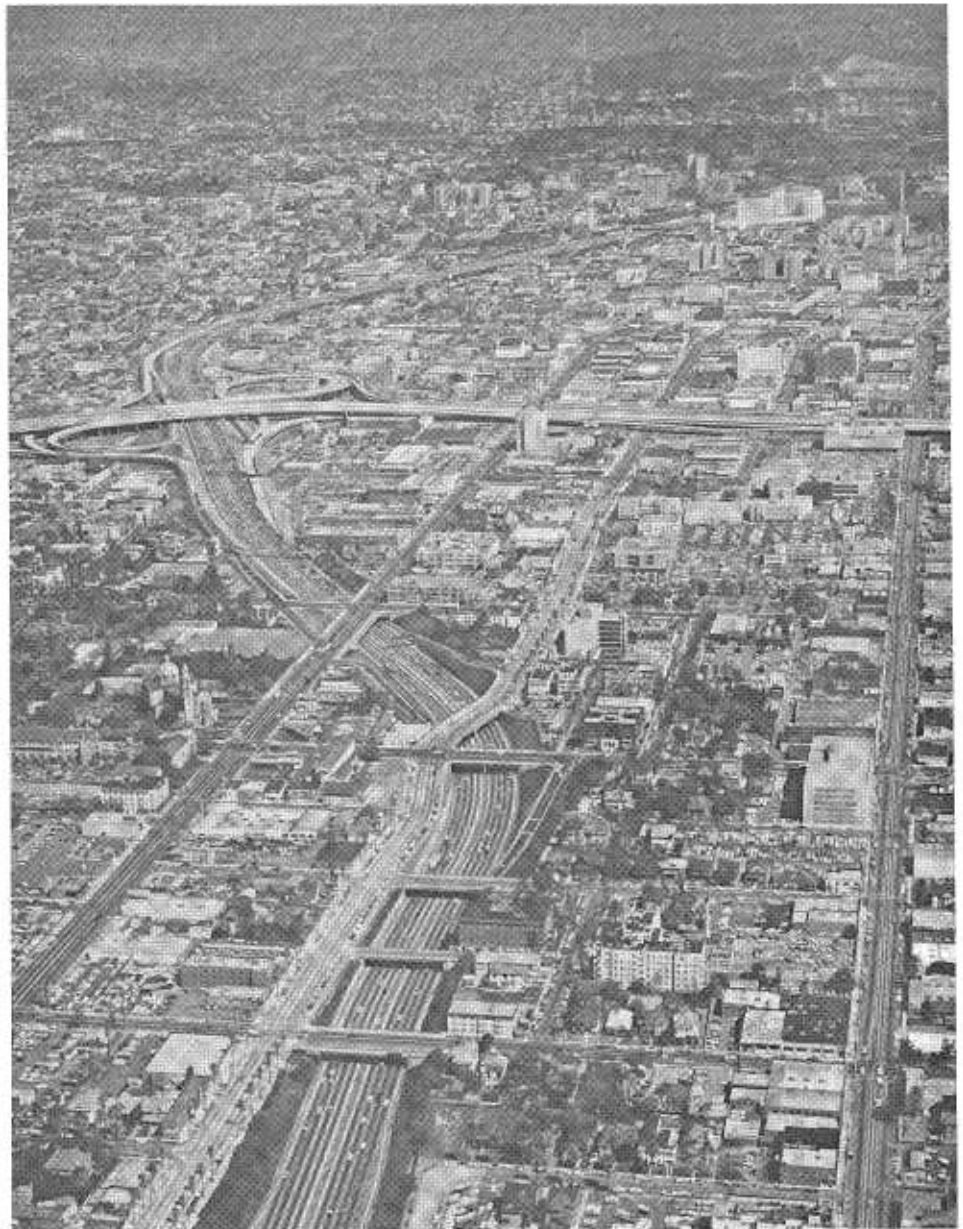
Seventeen million Californians today operate nine million motor vehicles—1 out of every 15 in the world and 1 out of 9 in the United States—while driving 70 billion miles a year.

By 1980, the State's population and vehicle registration will nearly double and motorists and truckers will drive each year a staggering 200 billion miles.

But operating within the framework of a sound financing structure provided by the Legislature, and emphasizing controlled access highways with built-in permanence of traffic capacity, the Division of Highways and California Highway Commission are providing for high standards of traffic safety and mobility in 1980 for these huge fleets of vehicles.

The "California Freeway and Expressway System" enacted by the Legislature in 1959 provides a master plan for the construction of a 12,414-mile network of freeways and expressways by 1980 at a cost of \$10,500,000,000. The system will connect all cities of 5,000 or more, and, though only 10 percent of the total road mileage, will carry an estimated 60 percent of all California traffic. It will serve every major industrial, agricultural, commercial and recreational region.

While progressing toward completion of this system, a "must" if the State is to continue to prosper, highway engineers are alleviating local deficiencies on non-access-controlled routes as funds permit. Roads are widened, resurfaced and realigned to ease curves. Existing freeway sections are landscaped to improve esthetic values. Projects are budgeted to



The world's busiest highway, the Harbor Freeway in Los Angeles, passes under and connects with the new Santa Monica Freeway, a part of the downtown loop which was opened to traffic in March. The final link of the 22.6-mile Harbor Freeway extending it southerly to San Pedro was completed in October.

achieve a balanced construction program of benefit to each area of the State.

#### Progress Toward Goal

Contrasted with the 480 miles of multilane divided highways open to traffic in 1947 when vehicle registration was less than half 1962's total, as of the end of this year California had approximately 2,592 miles of multilane divided highway in operation. This comprised 1,180 miles of full freeways, 833 of expressways, and 579 of conventional (non-access-controlled) highways. Another 356 multilane divided miles were under construction, only 40 of which were not full freeways.

Since the Freeway Law was enacted in 1939, the Highway Commission has adopted nearly 6,300 miles of freeway routings, or more than half the 12,414 miles in the freeway and expressway system. The adopted routings include 2,000 miles of California's 2,178-mile share of the 41,000-mile National System of Interstate and Defense Highways.

The interstate system represents the largest construction project in the world's history. Its California mileage is financed about 91 percent by the federal government and 9 percent by

state matching money. Each construction project must be approved by the U.S. Bureau of Public Roads to be eligible for federal funds.

A total of 473 miles of California Interstate System routes have been completed to standards adequate for present traffic, 286 miles of which are constructed to ultimate interstate freeway standards; 206 miles are under construction or advertised for bids, and 139 miles are included in budgeted projects.

The routing for the final link of the 316-mile Westside Freeway, an interstate route between Wheeler Ridge in southern Kern County and Woodland in Yolo County, was adopted last June.

Although several states show a greater mileage of interstate highways completed and opened to traffic, no state comes close to California in the amount of funds currently at work on interstate projects. This is due to California's putting considerable emphasis on the high-cost, short-mileage sections of multilane urban freeways to provide maximum traffic relief.

#### Long-range Planning

Much of the highway mileage on the freeway-expressway system, in-

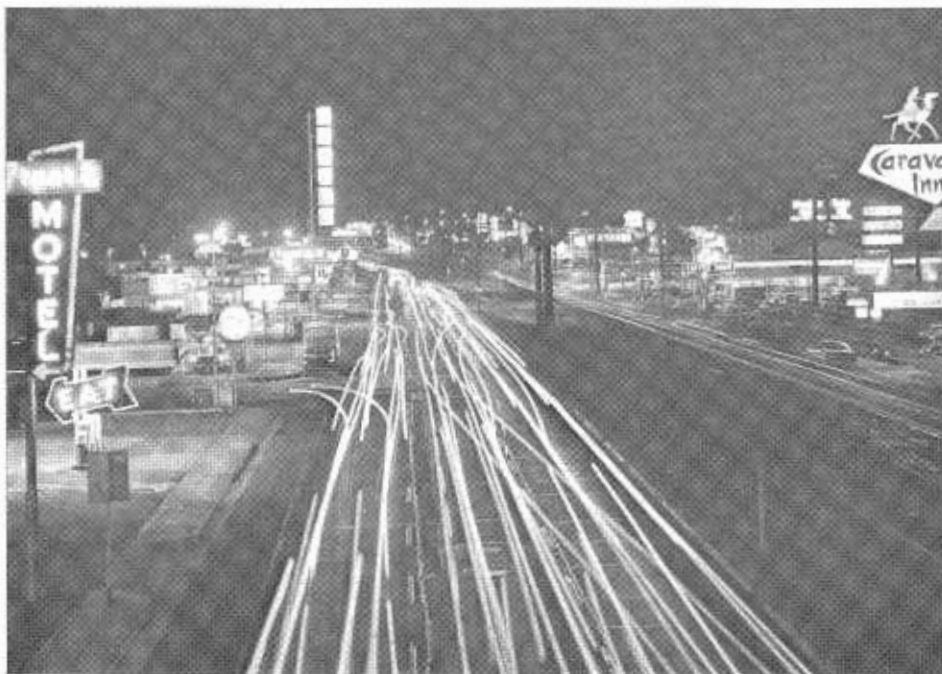
cluding the interstate, has been or is being constructed in stages.

Although legally expressways are classified as freeways, since access to them is controlled, they differ from full freeways in that some crossings at grade and left turn movements are permitted.

A freeway is appropriately named. It is free of traffic lights and stop signs, free of crossing traffic, and free of vehicles moving at random onto the highway from the sides of the road. It obtains these freedoms by limiting access to certain strategic points where traffic can enter or leave it safely, by not permitting left-turn movements across oncoming traffic, and by having intersecting streets, highways and railroads carried over or under it.

Both freeways and expressways are free from encroachment by roadside strip development that in time chokes conventional highways. Their carrying capacity and safety benefits are permanent. Both are also divided by median strips of varying widths.

Though both have a minimum of four lanes, some two-lane expressways are constructed, usually in rural or mountain areas with light traffic volume at present; but access is controlled and enough right-of-way is obtained



The patterns traced by vehicle headlights show turning movements onto the conventional highway from roadside businesses, adding further hazards for motorists already contending with spotting traffic signs and signals amid a blaze of neon. Through southbound traffic on U.S. 99 in Bakersfield (photo at left) has been using a portion of the freeway bypass of the city (right photo) since August. Northbound traffic lanes will be opened next fall when the entire bypass is completed.



to permit their future upgrading to four-lane expressway when traffic volumes warrant. By the end of 1962, California had 547 miles of two-lane expressways in operation.

Similarly, four- and six-lane freeways and even conventional highways frequently are built inside rights-of-way adequate for future additional lanes.

#### User Benefits

Of all the benefits that motorists obtain from freeways, the most important is safety. For the past several years, the fatality rate on freeways has been approximately one-third that of conventional rural highways, and the overall accident rate one-half.

Traffic engineers estimate that California's 1,180 miles of full freeway saved over 300 lives in 1962 and prevented more than 20,000 injuries and over 40,000 accidents. That is, if this freeway traffic had been carried on conventional highways, these figures would have been added to the state-wide traffic toll.

Another safety feature of freeways is that access is barred to bicycles and pedestrians, and fencing keeps children from crossing them except at overcrossings and undercrossings.

Traffic safety on freeways and other highways is being promoted by a multipronged attack on the State's traffic death toll by the Highway Transportation Agency. A \$100,000 appropriation by the 1961 Legislature is being used on research projects ranging from wrong-way freeway driving to analysis of the negligent driver.

The Division of Highways, Highway Patrol, Department of Motor Vehicles, University of California's Institute of Transportation and Traffic Engineering and the National Safety Council took part in working out study areas and priorities.

Not only do freeways save lives, they also save in fuel costs and wear and tear on equipment—more than one-half cent a mile when contrasted

with city streets—by eliminating stops and starts at intersections. They also save driving time.

The Engineering Department of the Automobile Club of Southern California conducted a peak-hour travel time study last May in Metropolitan Los Angeles. Its employees recorded their time spent in commuting to all parts of the area on freeways, highways and city streets.

Travel speeds were found to average 30.5 miles per hour in 1962, compared with 26 miles per hour in 1960 and 24 in 1957.

The auto club ascribed this greater mobility to the completion of important segments of the freeway system which have relieved traffic on older routes by providing alternates.

Important as saved time is to the individual motorist, it is of even greater consequence in commercial operations where drivers' wages and maximum utilization of vehicles are major cost factors.

#### Community Benefits

Rather than dividing the community through which it passes, a freeway, by providing unhindered traffic flow on roads over and under it, unifies an area previously divided by congested through traffic.

Local purchasers, always the mainstay of a community's economy, find it convenient to drive and park downtown when heavy and nonproductive through traffic is diverted to the freeway route. Residents discover that much of the traffic noise and gasoline fumes that had annoyed them had been caused by the former frequent stops and starts at intersections.

The Right of Way Research and Development Section of the Division of Highways investigates land sales and changes in gross retail volumes, among other methods, to determine the effects freeways have on community development.

Its studies show that very little difference exists between the sale prices of homes adjacent to modern landscaped freeways and comparable ones a few blocks away. In many instances, they have increased.

Owners displaced by freeway construction usually remain in the immediate area. Since they have received



# The Thousandth Mile



When the U.S. 101 freeway at Fortuna in Humboldt County was opened to traffic in July, California acquired its 1,000th mile of highway completed to full freeway standards. By year's end, this total had increased to 1,180 miles.

cash payments for their property, they more often than not acquire new properties more valuable than the ones they left, with resultant benefits to themselves and to the community.

By reducing transportation costs and time-distance factors, freeways make a community more attractive to industries seeking to relocate; a community's working force gains greater areas in which it can offer its skills, and local merchants record increased sales by downtown sites becoming more attractive to shoppers.

## The Highway Organization

Credit for the acknowledged pre-eminence of the California highway program is clearly attributable to successive Legislatures, which have enacted sound laws over the years.

The Legislature has determined that the highway construction program should be financed on a pay-as-you-go basis by taxes on the highway user, and has delegated to the California Highway Commission the responsibility for allocating such user taxes to highway projects.

It further has charged the Highway Commission with determining specific routings between termini which it, the Legislature, designates.

## California Highway Commission

Appointed by the Governor and confirmed by the State Senate, six members of the Highway Commission are business and professional men who serve without pay for four-year staggered terms. They represent the State as a whole rather than particular cities or areas.

The seventh member is the State Director of Public Works, ex officio chairman.

Commission duties include approving county primary road systems and authorizing condemnation proceedings, the execution of deeds and right-of-way relinquishments and abandonments, as well as budgeting highway funds and adopting freeway and highway routes.

## Division of Highways

The actual day-to-day operation of the highway program, including planning, design, right-of-way acquisition, construction and maintenance, is vested in the State Division of Highways, a unit of the Department of Public Works.

It is headed by the State Highway Engineer, assisted by a headquarters staff in Sacramento, and by engineers in charge of each of the State's 11 highway districts (map shown on page 7), who are responsible for all phases of the highway program in their regions.

This decentralization assures that the highway construction and improvement program is responsive to local conditions and needs.

All employees of the division are career civil servants chosen on the basis of competitive civil service examinations.

Inquiries on local highway matters should be addressed as follows:

- District I —Sam Helwer, District Engineer, 430 West Wabash Avenue, Eureka
- District II —H. S. Miles, District Engineer, 1657 Riverside Drive, Redding
- District III —Alan S. Hart, Assistant State Highway Engineer, 703 B Street, Marysville
- District IV —J. P. Sinclair, Assistant State Highway Engineer, 150 Oak Street, San Francisco
- District V —E. R. Foley, District Engineer, 50 Higuera Street, San Luis Obispo
- District VI —W. L. Welch, District Engineer, 1352 West Olive Avenue, Fresno
- District VII —E. T. Telford, Metropolitan District Engineer, 120 South Spring Street, Los Angeles
- District VIII—C. V. Kane, District Engineer, 247 Third Street, San Bernardino



- District IX —C. A. Shervington, District Engineer, South Main Street, Bishop
- District X —J. G. Meyer, District Engineer, 1976 East Charter Way, Stockton
- District XI —J. Dekema, Assistant State Highway Engineer, 4075 Taylor Street, San Diego

#### Highway Financing

Sound programing depends upon sound financing.

With a known number of registered vehicles, it is fairly easy to predict revenues from taxable gasoline and diesel fuel consumption, drivers' licensing and registration fees, weight fees on commercial vehicles, and taxes on for-hire trucking.

The State Constitution requires that all such highway-user source funds be spent for road construction and maintenance and for the administration of the Division of Highways, Department of Motor Vehicles and Highway Patrol. They may not be diverted for other purposes.

The largest source of funds is the six-cents-per-gallon state gasoline tax. Four cents per gallon are spent on construction and maintenance of state highways,  $1\frac{1}{8}$  cents on county roads and  $\frac{1}{8}$  cent on city streets.

The cities' share is distributed by the Division of Highways on a population basis, and the counties' share is distributed directly to the counties by the State Controller.

Approximately one-third of these street, road and highway funds represents moneys returned to the State from taxes imposed on the highway user by the federal government. This money is spent on the interstate routes (matched 9 percent by state funds) and on the federal-aid primary, secondary and urban highways (matched 42 percent by the State from user taxes).

State law requires that 55 percent of available construction funds be allocated each year to the 13 southern counties, and 45 percent to the remaining 45 counties; and that each county be guaranteed certain minimum amounts in a specified period according to a statutory formula based on relative state highway needs.

# Expressway Into Freeway



*Throughout the State, expressways are being converted to full freeway standards as traffic conditions warrant and funds become available. In the photo above, a section of U.S. 40 (Interstate 80) near Vacaville is being widened and cross traffic at grade eliminated by the construction of overpasses.*

The State Highway Commission adopts an annual budget for the coming fiscal year each October or November. The 1961-62 budget contained an overall total of \$633,460,000, of which \$509,078,000 was for construction and right-of-way acquisition. Corresponding totals for 1962-63 and for the new budget adopted in October for 1963-64 were \$658,370,017—\$527,792,917, and \$695,927,042—\$554,677,084, respectively.

(A chart illustrating sources of state highway funds and the manner in which they are disbursed is shown in this section.)

#### Freeway Route Selection

As mentioned previously, the Legislature designates the termini of all

state highways, whether conventional or freeway type, sometimes specifying certain control points.

Selection of specific routing is a responsibility of the Highway Commission. Governing bodies of cities and counties are notified at the initiation of studies leading to freeway construction. Co-operation and information on the area's master plan for transportation and development are requested.

Traffic origin and destination studies are correlated with such considerations as community plans for land use, engineering controls imposed by rivers and terrain barriers, economic and social controls including relative costs of right-of-way acquisition, and the



desire to avoid damage to schools, churches, parks and hospitals.

Consultations are frequent with utility and transportation companies, water districts, and interested agencies of federal, state and local government.

When the feasible routes are mapped and user benefits, cost factors and other considerations for each analyzed, public hearings are held by the district highway engineer to explain the studies to local residents and to obtain their views.

The district engineer sends his completed report and hearing transcripts to the State Highway Engineer in Sacramento, who, in turn, submits a recommendation to the Highway Commission.

The commission asks the local governmental bodies if they desire a public hearing before action is taken to adopt a route. Such a request is always

granted. Occasionally, the commissioners may decide without a request that the public interest requires an additional hearing.

Finally, the commission weighs the traffic service benefits, construction costs and other features of each feasible alternative and adopts the routing which appears to serve the greatest public interest.

Throughout the route selection process, every effort is made to insure that the views and rights of all—property owners, local merchants, civic planners, and users of the new route, among others—are considered and protected.

The Division of Highways staff confers further with local officials and negotiates a freeway agreement with the city council or board of supervisors involved covering local street adjustments. Local agencies thus have

a voice in such design factors as types and locations of interchanges and traffic separation structures.

When this agreement has been obtained, the Division of Highways can proceed with right-of-way acquisition and construction as funds become available.

#### Right-of-way Acquisition

The Right of Way Department completed 9,081 parcel acquisitions for highway purposes in fiscal 1961-62 at a cost of \$151,497,226. Over 97 percent of these transactions were arrived at by negotiation with the property owner. Only 2.7 percent of the transactions were concluded after eminent domain court proceedings.

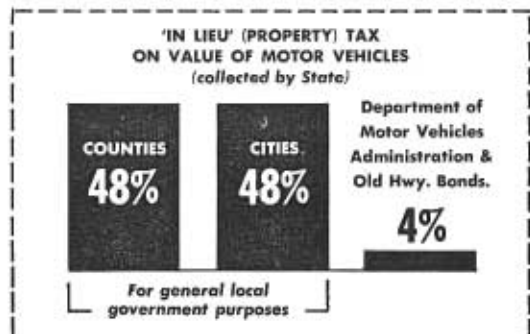
After appraisal, the property owner is offered fair market value for his holdings as needed. This has been defined as "the highest price estimated

## Highway User Taxes Including Federal Aid

Percentages based generally on 1963-64 Budget.

State of California  
Department of Public Works  
Division of Highways

SOURCE	DISTRIBUTION			
	HWY. PATROL & D.M.V.	STATE HIGHWAYS	COUNTY ROADS	CITY STREETS
<b>GAS TAX</b> 6¢ per gal. <b>42%</b>		4¢ per gal. <b>28%</b>	1 3/4¢ per gal. <b>10%</b>	3/4¢ gal. <b>4%</b>
<b>MOTOR VEHICLE FEES</b> <b>18%</b>	<b>9%</b>	<b>7%</b>	<b>2%</b>	
<b>3%</b> USE FUEL TAX (Diesel)		<b>3%</b>		
<b>2%</b> TRANSPORTATION TAX		<b>2%</b>		
<b>FEDERAL AID INTERSTATE</b> <b>28%</b> (Note 1)		<b>28%</b>		
<b>7%</b> FEDERAL AID REGULAR (Note 2)		<b>6%</b>	<b>1%</b> (Note 3)	
<b>TOTALS</b>	<b>9%</b>	<b>FEDERAL AID HWY. USER TAX</b> <b>74%</b> 34% 40%	<b>13%</b> (Note 4)	<b>4%</b> (Note 4)



#### NOTES:

1. Federal Aid Interstate must be matched 9% by State funds from above sources.
2. Federal Aid Primary, Secondary, and Urban must be matched 42%, mostly by State funds from above sources.
3. Does not include matching funds, up to \$100,000 per county per year, from State Highway Fund.
4. Does not include \$5,000,000 per year State highway matching funds for local railroad grade separations, or about \$1,500,000 a year for urban extensions of F.A.S. county roads.



Division of Highways personnel confer with interested governmental, civic and business representatives during all stages of freeway planning. At right, William Mahan of the Sacramento historical Landmarks Commission points out an area of historical significance adjacent to a future freeway in that city to Alan S. Hart (far right), Assistant State Highway Engineer, District III.



in terms of money which the land will bring if exposed for sale in the open market with a reasonable time to find a purchaser, buying with full knowledge of all the uses and purposes to which it is adapted and for which it is capable of being used."

In fairness to all taxpayers, this "fair market value" appraisal is uninfluenced by the owner's skill at bargaining.

Although the Right of Way Department has for the past decade leased space under certain freeways for private parking and open air storage purposes, space under interstate freeways was previously restricted to public parking.

The Highway Commission in April, acting pursuant to 1961 enabling legislation, authorized the department to lease space above as well as under freeways for commercial purposes, provided highway safety is adequately protected and local zoning regulations are not in conflict.

Similar leasing of space above and below interstate freeways was authorized by the federal government last May.

#### Landscaping and Planting

The Division of Highways planted 374,850 assorted trees and shrubs and 4,199,940 ground cover plants and cuttings in fiscal 1961-62 to improve the esthetic appearance of freeways, provide erosion and weed control and promote traffic safety.

In addition to landscaping and functional planting (planting for erosion and fire control, the delineation of structures, and the reduction of traffic noise and headlight glare), a tree planting program was begun in fiscal 1961-62 to replace trees removed by highway construction and to improve the

appearance of highways where more expensive landscaping and planting are not justified.

The trees selected will restore the native appearance to the area, and, in keeping with local conditions, will not require maintenance after they become established.

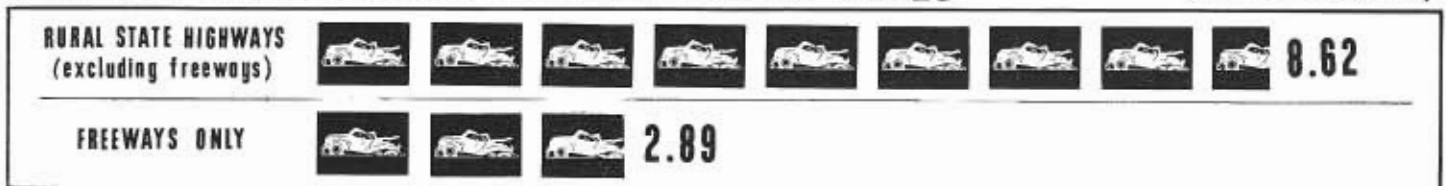
A total of \$3,176,000 is provided in the 1963-64 budget for 29 landscaping, functional and tree planting projects.

#### Scenic Highways

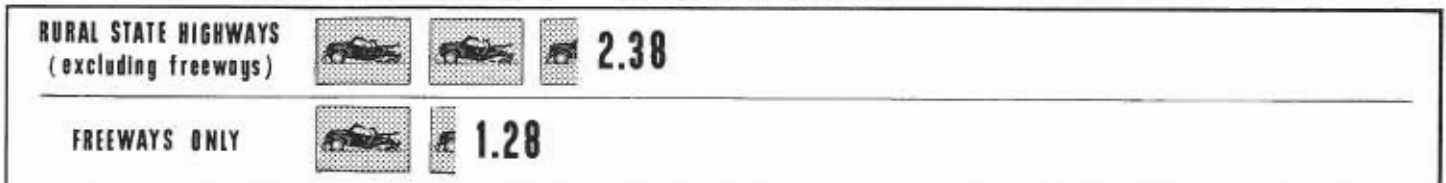
A preliminary report on a proposed system of scenic highways, prepared by an interdepartmental group composed of representatives of the Depart-

### FATALITY RATE PER 100 MILLION VEHICLE MILES

(1957-1961 AVERAGES)

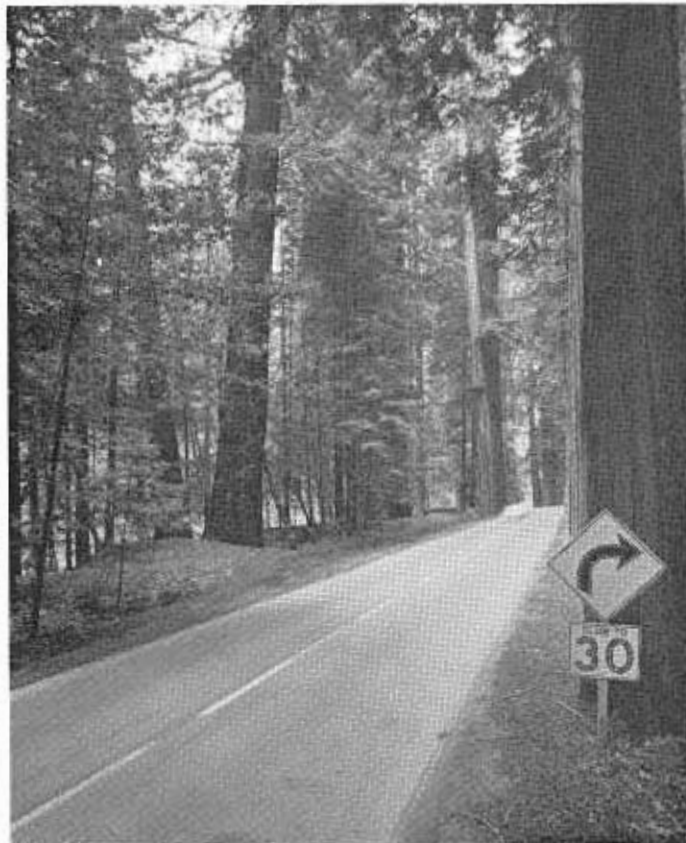


### ACCIDENT RATE PER MILLION VEHICLE MILES





*While the safe and efficient movement of traffic is the major mission of the Division of Highways, consideration is given to esthetic values in freeway construction. The photo above shows the pleasing effect obtained by landscaping a section of the Colorado Freeway in the Pasadena area. The completion of a parallel freeway section on the Redwood Highway (U.S. 101) near Myers Flat has removed through traffic from the famed Avenue of the Giants (below). Motorists may travel at leisure along this inspiring route.*



ment of Public Works, the Division of Beaches and Parks and the State Office of Planning, was presented to the Legislature in March, 1962.

The report suggested that 5,000 miles of highway, most of them in existence, be designated as "scenic" as they traverse areas containing "outstanding views, flora and geology and other unique natural attributes and historical and cultural resources affording pleasure and instruction to the highway traveler."

Well publicized workshop sessions were held in the various highway districts in September and October to obtain maximum local participation and to discuss city, county and state responsibilities in preserving the scenic values of selected corridors as the basis for further legislative consideration in 1963.

#### **Contract Data**

During the 1961-62 fiscal year, the Division of Highways opened bids on 560 projects with an estimated construction value of \$352,095,200, including construction engineering. Of these 560 projects, contracts were awarded for 525 projects with a value of \$346,890,900 and bids not in the best interest of the State were rejected on 20 projects. The 15 remaining projects were awarded after the close of the fiscal year.

Contracts also were awarded during the year for 18 projects valued at \$20,137,600 on which bids had been received during the previous fiscal year.

The total of \$367,028,500 in contracts awarded during the year was made up of \$333,586,200 for construction on state highways; \$14,643,100 for work on county roads including the federal-aid secondary system; and \$18,799,200 for maintenance and emergency repair, and work for other agencies.

The state highway system contracts of \$333,568,200 consisted of \$204,001,800 from the 1961-62 budget, and \$129,584,400 from the 1962-63 budget which were awarded under statutory provisions permitting the award of contracts as early as January 1, six months before the start of the fiscal year.

The contracted state highway work involved improvement of 1,736 miles of highways and construction of 524 bridges and separation structures.



# Construction Progress

With projects underway ranging from such major jobs as the construction of the Webster Street Tube in Alameda and the San Diego Freeway through the Santa Monica Mountains to the relatively minor widening of a rural highway and installing channelization at an urban intersection, the State's highway construction program seeks the maximum traffic benefit from available highway user funds.

The program is balanced not only between the various areas of the State but also between relieving present deficiencies and constructing for tomorrow's needs.

## San Diego Area

U.S. 101 (Interstate 5) occupies the construction spotlight in San Diego County with 12 major projects either recently completed, under construction, or budgeted for the current fiscal year.

Two recently completed contracts provided a full freeway in U.S. 101 from Palm Street to the four-level interchange with U.S. 395, also completed this year.

Three projects under construction will extend the freeway southerly between San Diego and National City and connect with the Montgomery



Work continues on the superstructure of the Vincent Thomas Bridge between San Pedro and Terminal Island. The bridge will be opened to traffic early in 1964.

Freeway leading to the Mexican border. Provision is made in the new budget to widen the Montgomery Freeway in National City and to connect the new freeway in San Diego with Pacific Highway at Washington Street.

Completion of U.S. 101 to interstate freeway standards from San Diego north toward Carlsbad depends on the time required for the settlement of foundation fills across coastal lagoons, now under construction. A \$4,900,000 freeway section in the Del Mar-Encinitas area is budgeted for fiscal 1963-64.

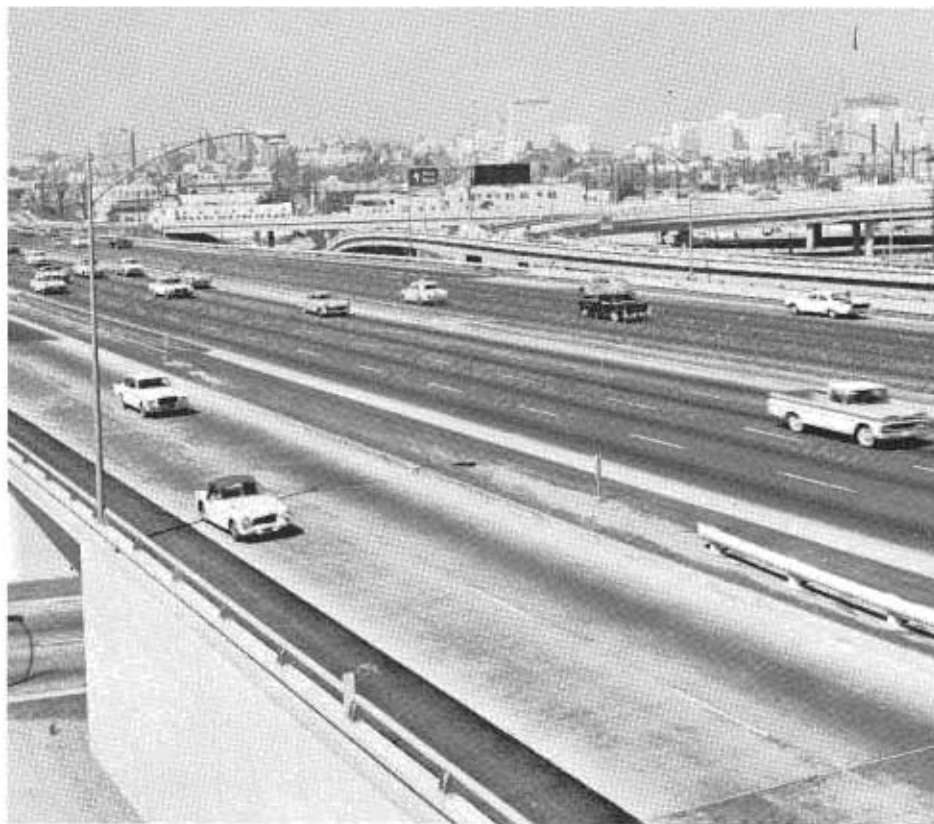
Current or recently completed construction, supplemented by newly budgeted projects, will provide 10 miles of freeway in the Mountain Springs area on U.S. 80 (Interstate 8) near the San Diego-Imperial county line; four more miles on the same route easterly from El Cajon; and the



The entire length of U.S. 40 (Interstate 80) between Sacramento and the Nevada line will be raised to multilane freeway and expressway standards by 1964. At left, westbound lanes near Emigrant Gap are nearing completion. The existing highway (lower level at left) will be reconstructed and widened on the same general alignment at this point to serve as the eastbound lanes.



Shown above is a section of the Crosstown Freeway in San Diego which was opened to traffic in June. It turns left at center of photo to interchange with the Cabrillo Freeway (U.S. 395) at the south end of Balboa Park (left center). The Crosstown is a section of the San Diego Freeway which eventually will run from the San Fernando Valley in Los Angeles County to the Mexican border.



Above is a section of the Santa Monica Freeway serving the downtown Los Angeles business district, which opened in March. The new freeway will be extended to the Pacific Coast Highway at Santa Monica.

final unit of a midcounty freeway and expressway connection on State Sign Route 78 between U.S. 101 at Ocean-side and U.S. 395 at Escondido.

#### Los Angeles Metropolitan Area

The earliest freeways in Metropolitan Los Angeles converged on the city's central district. This year saw completion of the first freeway bypass of the congested business section, and construction emphasis in the next several years will be on interconnecting freeways toward the area's periphery.

The most significant single event in the area was the opening to traffic in March of the 23-mile freeway loop, encircling the downtown business district, formed by the junction of the Golden State and Santa Monica freeways (Interstate Routes 5 and 10). By means of the East Los Angeles Interchange, the freeway loop provides direct connections with the Santa Ana, San Bernardino, Pasadena, Glendale and Harbor freeways, and indirect connections with all other freeways in the region.

By offering motorists alternative routes, the loop has succeeded in markedly relieving traffic congestion on the older four-level interchange (Harbor - Hollywood - Pasadena freeways), which in 1961 carried 343,000 vehicles a day, and has reduced traffic on the Hollywood Freeway by 16 percent in the downtown slot.

The Golden State Freeway now extends northwestward to Lankershim Boulevard in San Fernando Valley and has eliminated most of the traffic congestion on San Fernando Road and Riverside Drive.

The Santa Monica Freeway, opened to traffic from the East Los Angeles Interchange westward for 4.3 miles in December, is under construction to the San Diego Freeway. A final segment to link the Santa Monica Freeway with the Pacific Coast Highway in Santa Monica is financed in the 1963-64 budget.

Approximately 45.2 miles of the San Diego Freeway (Interstate 405) were completed by year's end. As a fitting climax, the last of this mileage was in the largest project—a \$20,000,000 section from West Los Angeles across the Santa Monica Mountains to the San Fernando Valley. This job is one



of the most impressive ever undertaken in Southern California in terms of cost and amount of earth excavated; approximately 18 million cubic yards of earth were moved.

The San Diego Freeway has now been completed or is under construction from its junction with the Golden State Freeway in San Fernando to Westminster in Orange County. The 1963-64 budget provides \$8,900,000 to extend it southeasterly to Huntington Beach.

Bids for the first project on the San Gabriel River Freeway (Interstate 605) were opened in November. This 22-mile route will connect the San Bernardino Freeway in El Monte with the Garden Grove Freeway in Westminster. The eight-mile section from Whittier north to the San Bernardino Freeway was financed previously, and another 11 miles from Whittier south to Dairy Valley are financed in the new budget at a cost of nearly \$30,900,000.

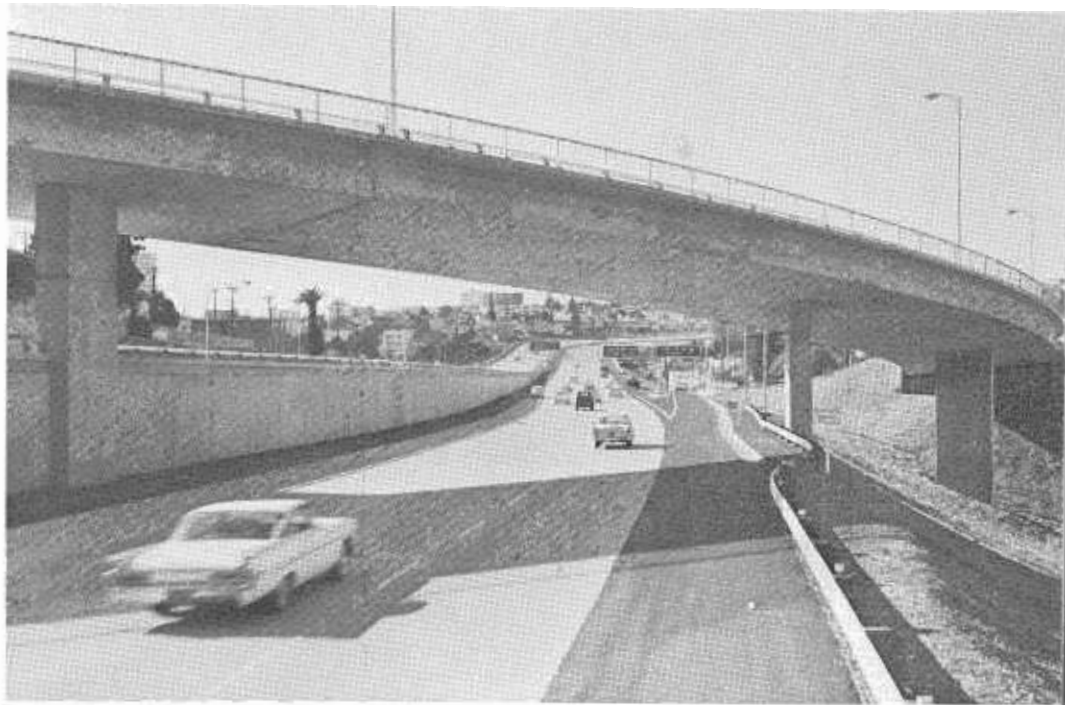
The final link of the Harbor Freeway, the most heavily traveled highway in the world with an average daily count of 200,000 vehicles near downtown Los Angeles, was opened to traffic in October, completing the \$103,500,000 route between the Los Angeles Civic Center and Battery Street in San Pedro, a distance of 22.6 miles.

Of the 51 miles of freeways in this area opened this year, 10.8 important miles on three routes were completed in September alone.

A 2.8-mile segment of the Ventura Freeway, completing the stretch from its junction with the Hollywood Freeway to an interchange with the Golden State Freeway, affords motorists an alternate route to downtown Los Angeles and has relieved traffic conditions on the Hollywood Freeway.

A 4.5-mile freeway loop around the business district of the City of Ventura was hailed by the mayor as of "more significance to us than the coming of the railroad in 1886."

A 3.5-mile stretch of the Newport Freeway completed this route between the Riverside and Santa Ana Freeways in Orange County. It will be extended southerly to connect with the Pacific Coast Highway at Newport Beach.



Work on the substructure of the San Pedro-Terminal Island Toll Bridge, the first toll bridge in Southern California, was completed this year and construction is progressing on the superstructure, with completion scheduled for January 1964.

The first project on the Pomona Freeway, which will parallel the San Bernardino Freeway for the 30 miles between Los Angeles and Pomona and relieve traffic on the older route, has been financed at an estimated cost of \$8,400,000. It is for 3.4 miles of eight lanes between the East Los Angeles Interchange and Third Street in East Los Angeles.

#### San Bernardino-Riverside

A freeway through Redlands on U.S. 70-99 (Interstate 10) was opened to traffic in August, now providing 125 miles of continuous freeway and expressway between downtown Los Angeles and Indio. A five-mile segment of six-lane freeway on U.S. 60-70-99 (Interstate 10) between Banning and Cabazon is in the current budget.

Two projects on Interstate 10 in the new budget, with an aggregate cost of \$10,700,000, will convert the nearly 12 miles between Redlands and Beaumont from four-lane expressway to six-lane freeway, and will provide 10 miles of four-lane freeway on U.S. 60-70 slightly east of Indio.

Freeway construction is underway on the Barstow Freeway (U.S. 91-466, Interstate 15) between the Nevada state line and 23 miles southwesterly,

The MacArthur Freeway (Interstate 5W) was opened to traffic from the distribution structure near the San Francisco-Oakland Bay Bridge to Grand Avenue in Oakland in May. Construction is continuing through Oakland and San Leandro.

connecting with a 25-mile segment completed last year east of Baker. Work began on another 24-mile unit of this route east of Barstow in November.

A 5.6-mile freeway section was completed in November on U.S. 60 in and west of Riverside, and another 4.8 miles is under construction through Sunnymead. The latter job will be extended to State Sign Route 79 by a project on which bids were opened in December.

#### Central Coast Counties

Completion of the 10-mile freeway bypass of Santa Maria together with a 2.3-mile freeway project under construction in Santa Barbara will eliminate two more of the few remaining gaps in U.S. 101 freeway and expressway through Santa Barbara County.

Work progresses on the Ward Memorial Freeway which will link the University of California Campus at Goleta with U.S. 101 near the southern end of an 8.5-mile freeway project completed in May.

One interchange was completed and three more are under construction on U.S. 101 in San Luis Obispo County to convert expressway sections to full freeway.





**ABOVE**—The Southern Freeway in San Francisco, which will roughly parallel Alemany Boulevard, is under construction from the James Lick Memorial (Bayshore) Freeway (upper center) to Orizaba Avenue. It will be continued by funds in the new budget to connect with the Junipero Serra Freeway (Interstate 280) in Daly City.

**BELOW**—Sixteen miles of the Antelope Valley Freeway (U.S. 6), which will run from the Golden State Freeway to the Kern County line north of Lancaster, are under construction and another eight miles are financed in the new budget.



Two two- and four-lane expressway projects on State Sign Route 1 between Morro Bay and Cambria will be completed early next year, and work has just started on a two-lane expressway bypassing Cambria. A four-lane freeway for 2.8 miles on this route near Cayucos is financed in the new budget.

The six-mile freeway bypass of Gonzales on U.S. 101 in Monterey County is nearly completed, and construction has begun on an 11-mile freeway section between north of Bradley and south of San Ardo.

Four more freeway projects on U.S. 101 in Santa Barbara, San Luis Obispo and Monterey Counties are in the 1963-64 budget at an estimated \$8,700,000.

#### **San Francisco Bay Area**

The first three units of the Southern Freeway (U.S. 101) are under construction between the James Lick Memorial (Bayshore) Freeway and Orizaba Avenue in San Francisco.

A fourth unit is financed by the new budget as part of a \$10,200,000 project to extend the Southern Freeway to the Junipero Serra Freeway (Interstate 280), and construct the latter freeway through Daly City.

Also under construction is the first unit of the Southern Freeway Extension easterly of the James Lick Memorial Freeway Interchange.

Construction is more than 50 percent complete on the first unit of the 19th Avenue Freeway in San Mateo. Bids were opened in October for a freeway on State Sign Route 1 in Pacifica.

Work began on the first 7.2 miles of the Junipero Serra Freeway in Santa Clara County in July.

The first three units of the MacArthur Freeway (Interstate 5W) from the distribution structure near the San Francisco-Oakland Bay Bridge to Grand Avenue in Oakland opened simultaneously to traffic in May. Another unit between Grand Avenue and Park Boulevard was opened in September. Construction is continuing on this freeway for another 9.5 miles through San Leandro.

The largest project underway in the region is the \$17,000,000 Webster Street Tube, paralleling the existing

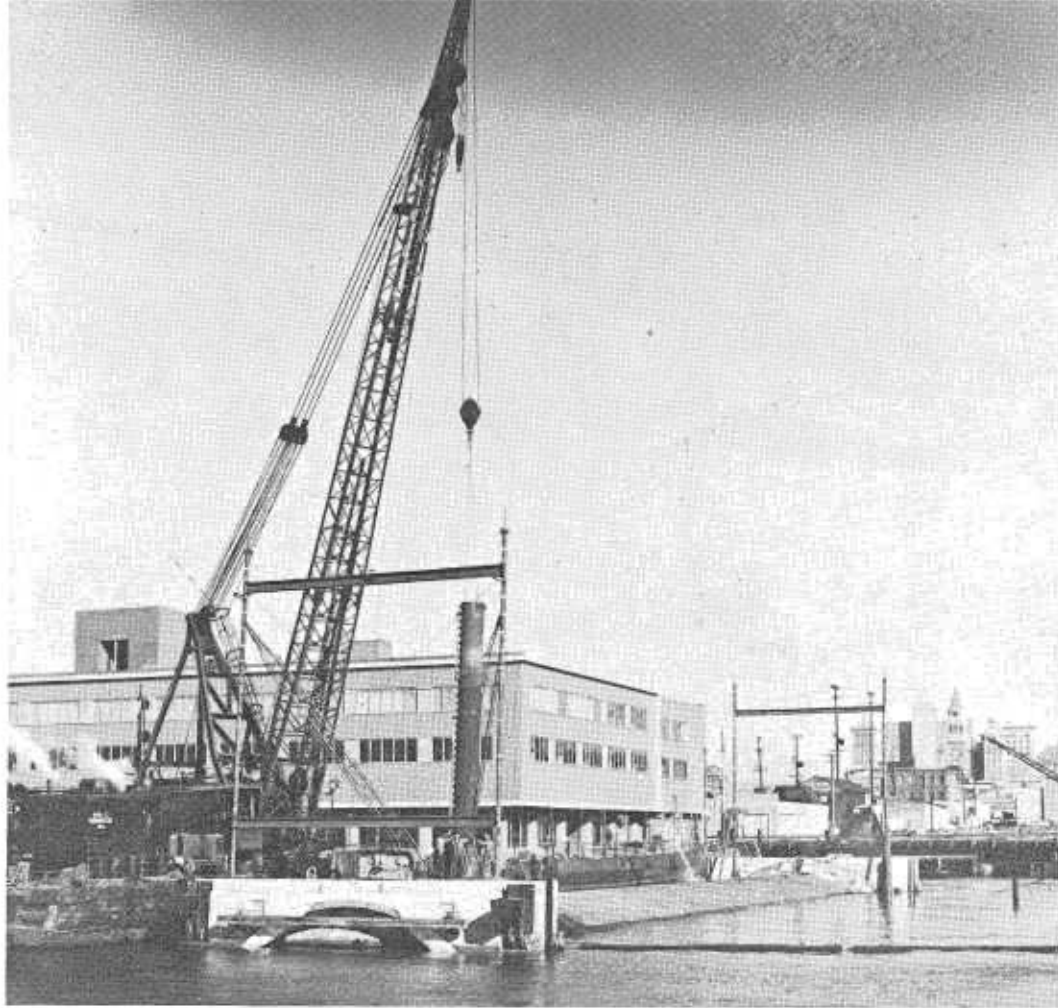


Posey Tube and connecting Alameda and Oakland. The new bore will be completed early in 1963, and, when revisions have been made to the ventilating, lighting and traffic controlling systems of the Posey Tube, each tube will carry two lanes of one-directional traffic.

The Benicia-Martinez Toll Bridge and a freeway (Interstate 680) connecting it with U.S. 40 (Interstate 80) near Vallejo opened to traffic in September. Three contracts totalling over \$28,200,000 are underway for freeway sections on this interstate route on the southern side of the new bridge.

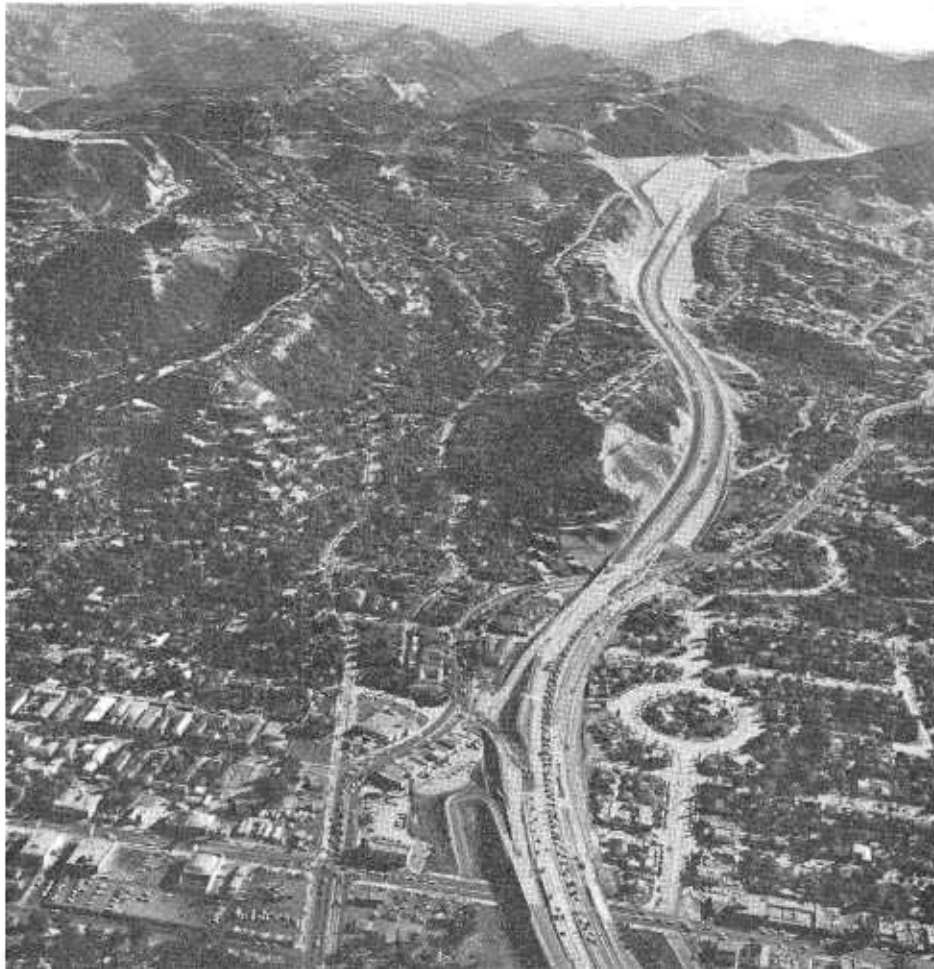
Work also continues on the third two-lane bore of the Caldecott Tunnel on State Sign Route 24 at the east city limit of Oakland and a connecting eight-lane freeway between the tunnel and Orinda Highway.

Nearly \$17,500,000 is provided in the new budget for other freeway projects in Alameda and Contra Costa Counties, including portions of two major interchanges in Oakland and



A floating crane positions a temporary access cylinder above the last of the 12 precast sections of the Webster Street Tube between Alameda and Oakland. When the new bore is completed early in 1963, the parallel Posey Tube will be closed to traffic and renovated, after which each tube will carry two lanes of one-directional traffic.

Motorists in Los Angeles received a welcome Christmas present on December 21 when a \$20,000,000 section of the San Diego Freeway from West Los Angeles across the Santa Monica Mountains (background) to San Fernando Valley was opened to traffic. Approximately 18 million yards of earth were moved for this project.



three miles of six-lane facility on State Sign Route 21 (Interstate 680) north of Dublin, which will include the interchange with U.S. 50 (Interstate 5W).

Two major freeway projects on U.S. 101 in Marin County totalling approximately \$7,500,000 were advertised for bids this fall.

Two freeway sections on U.S. 101 between Santa Rosa and 15 miles north in Sonoma County were opened to traffic in November, and work is underway on the first 5.5 miles of the State Sign Route 12 Freeway westerly of Santa Rosa, including a three-level interchange with U.S. 101.

Construction started this fall near Asti on a 3.6-mile freeway section of U.S. 101, with another section to the south financed in the new budget.

#### North Coast Counties

A contract for completion of 13 bridges between Ukiah and Calpella on U.S. 101 in Mendocino County is





This view looking westward shows construction on the westbound lanes of the Yolo Causeway on U.S. 40 (Interstate 80) which has replaced the three-mile structure on the right, once the longest highway trestle in the world. The eastbound lanes will carry two-way traffic until construction is completed in 1963.

Illustrating some of the problems encountered in the construction of the Redwood Parks Freeway through rugged country is this view of the Eagle Point Viaduct in Humboldt County. This 16-span bridge structure will carry four freeway lanes on a 56-foot roadway for a quarter-mile.

nearing completion and the freeway that will include these structures is under construction as is a freeway section to the south between six miles north of Hopland and Ukiah.

Two projects are under construction for 11.6 miles of freeway on U.S. 101 in Humboldt County between 3.6 miles south of Phillipsville and Myers Flat at an estimated cost of \$12,100,000. These sections connect with 12 miles of the Redwood Parks Freeway between Myers Flat and Englewood completed previously.

The 3.9-mile U.S. 101 Freeway Bypass of Fortuna was completed in July. This project included the 1,000th completed freeway mile in the State.

Another two projects will provide 7.2 miles of freeway on this route between Loleta Drive and Elk River by next summer.

The Collier Tunnel and approaches on U.S. 199 just south of the Oregon border will be opened to traffic next summer, ending the steep and winding climb over Hazelview Summit.

#### North State Region

Two interstate routes, U.S. 40 (Interstate 80) and U.S. 99 (Interstate 5)

had the greatest amount of freeway construction in Northern California this year.

Projects underway on U.S. 40 include freeway sections east of Vallejo through American Canyon; through Vacaville to State Highway Route 90 near Dixon; a new bridge-and-fill crossing of the Yolo Bypass (partly in operation) to replace the bottleneck of the narrow Yolo Causeway; and several projects in the Sierra Nevada connected with route relocation near and over Donner Summit.

One of these mountain jobs, a 5.4-mile section near Emigrant Gap, will be completed by next fall and another 6.3-mile section near Cisco Grove in 1964. One of two contracts for grading and structures on the 10.5 miles over Donner Summit was completed this year and the second will be completed by next summer. A total of \$5,455,000 is contained in the new budget for the paving, which will complete a continuous freeway and expressway between Sacramento and the Nevada line.

More than \$22,500,000 additional is in the new budget for a freeway conversion project southwest of Vacaville, and for the superstructure and freeway approaches of a new Sacramento River Bridge needed for the rerouting of U.S. 40 through Sacramento. Bids for construction of the substructure of the bridge were opened in December.

A 5.6-mile freeway project on U.S. 50 east of Sacramento was completed recently and work progresses on a 2.8-mile section west of Placerville.

Work has just been completed on a major freeway project on U.S. 99 (Interstate 5) south of Castella in Shasta County to provide 30 miles of continuous freeway and expressway in the Sacramento River Canyon.

Freeway construction is also underway on this route from Red Bluff north to Cottonwood, linking with a previously completed section from Cottonwood to Anderson; and along the shore of Shasta Lake between Pit River and O'Brien. Preliminary work for a 6.8-mile freeway relocation near Mount Shasta City has begun, and the new budget contains \$4,800,000 to complete the project.



The new budget provides \$7,700,000 for grading and structures for a future freeway section on U.S. 99 between north of Anderson and two miles north of Redding, along with a freeway section on State Sign Route 44 in and east of Redding.

Another \$3,160,000 is budgeted for structures and approaches for a future freeway in the vicinity of Red Bluff on U.S. 99W (Interstate 5).

A two-lane expressway section on U.S. 299 east of Douglas City that was just completed will be extended another 2.1 miles easterly by funds in the new budget.

The first unit of a freeway on U.S. 99E through Chico is under construction for 1.3 miles, and a second unit for 2.6 miles to the south is in the new budget.

Other major projects completed in 1962 include the relocation of U.S. 40 Alternate (in connection with the Feather River Project) between Wicks Corner and Jarbo Gap in Butte County, including the construction of a bridge across the West Branch of the Feather River; and a two-mile freeway section on U.S. 40 Alternate southwest of Oroville.

A 6.8-mile freeway is under construction linking the above two projects.

Two-lane expressway projects recently completed include 5.8 miles on U.S. 299 east of Canby in Modoc County, including a new Pit River Bridge; two projects on U.S. 395 in Lassen County, one near the Modoc county line and the other southeast of Susanville; and a 10.3-mile section on State Sign Route 89 between U.S. 99 and McCloud in Siskiyou County.

#### **Foothill and Mountain Routes**

Completion this fall of an additional 5.6 miles of freeway on U.S. 466 west of Tehachapi in Kern County extended a 12-mile project opened last year. The new budget provides \$4,100,000 for grading for a future 7.6-mile freeway extension toward Tehachapi.

A contract for freeway relocation on U.S. 395 to improve crossing of the Conway Summit in Mono County was completed in October. A two-mile two-lane expressway on Tioga Pass Road (State Sign Route 120) east of



*At bottom of photo, the U.S. 101 Freeway through the City of Ventura breaks away from the old highway which traverses the business district. Part of the new freeway, at upper right, was completed in September.*

Yosemite National Park has been budgeted for fiscal 1963-64.

Two-lane expressway construction is under way on projects on State Sign Route 108, west of Twain Harte and east of Long Barn in Tuolumne County; on State Sign Route 88 above Peddler Hill in Amador County and from east of Picketts to Woodfords in Alpine County; and on State Sign Route 49 between Sierra City and Bassetts in Sierra County.

A widening project on State Sign Route 28 between Tahoe City and the Nevada line was completed this summer.

#### **San Joaquin Valley Area**

A 13.3-mile section of the Bakersfield Bypass on U.S. 99 was opened to southbound traffic in August. The northbound lanes of this section will

be opened when the final 5.3-mile section of the bypass is completed next October. The combined construction cost of these two sections will be more than \$13,000,000.

Other current projects in Kern County include an 8.8-mile freeway conversion job about 20 miles south of Bakersfield and a 3.3-mile section near MacFarland. Bids were opened in November for another nine-mile freeway conversion project north of Bakersfield between Minkler Spur and Lerdo Highway.

The new budget provides funds to convert U.S. 99 from four-lane expressway to eight-lane freeway between just north of the Los Angeles county line and Fort Tejon, connecting with the new eight-lane Grapevine section.

Two projects in Tulare County, just completed, have converted another 19 miles of U.S. 99 expressway to full freeway. One is just south of Tulare, the other between Goshen and Traver. In Fresno County, a total of 15.2 miles of this route in and south of Fresno is being relocated on a full freeway basis.

Another major freeway project is underway on State Sign Route 198 west of Lemoore in Kings County near the new Naval Air Station.

Freeway projects budgeted for the 1962-63 fiscal year include a short section on U.S. 99 in Tulare County immediately south of the Fresno county line; 5.5 miles on U.S. 99 south of Madera; 2.5 miles on U.S. 99 south of Modesto; converting 6.7 miles of U.S. 99 from four-lane expressway to six-

lane freeway between the Calaveras River north of Stockton and existing freeway construction near Lodi; 5.4 miles on State Sign Route 198 in Visalia, and 3.9 miles on State Sign Route 190 near Porterville.

Construction is under way on freeway projects on U.S. 99 through Merced, Modesto and Lodi. A 2.2-mile freeway section just south of Modesto was opened in November.

#### Summary

While major emphasis in 1962 was placed on the 12,414-mile freeway and expressway system, particularly on the Interstate System routes, this construction was balanced by highway improvement projects on local service and feeder roads.

The principle of stage construction was employed to get the most in traf-

fic safety and efficiency from available funds for current needs, while providing for future upgrading of highway facilities to meet the demands of 1980 when the State's population and vehicle traffic will double.

Many road sections were built as two-lane expressways with provision for future interchanges to convert them to multilane full freeway standards. Freeway sections were constructed with four and six lanes within rights-of-way that permit future widening.

The goals of the Division of Highways and the California Highway Commission continue to be safety, convenience and mobility for the motorist and freer traffic flow in 1980 than exists today.

*The narrow, inadequate two-lane highway on the lower level was U.S. 99 (Interstate 5) south of Castella in Shasta County. Construction has just been completed on the section to its left, which provides 30 miles of continuous freeway and expressway in the Sacramento River Canyon. Freeway construction is under way on this route north of Red Bluff and along the shore of Shasta Lake, and is budgeted for construction near Redding and Mount Shasta City.*





# • Operations

- *The construction, maintenance, equipment and materials and research departments are administered under the direction of the Assistant State Highway Engineer—Operations*

## CONSTRUCTION

Administration of construction contracts, except for those comprised primarily of structures and administered by the Bridge Department, is the responsibility of the district in which the project is located.

This assignment is accomplished through the teamwork of a staff of engineers, technicians and others whose primary duties are to assure that the terms of the contracts are met. This involves interpretation and enforcement of specifications and plans.

*Grading in rugged terrain for the south approach to the Randolph Collier Tunnel on U.S. 199 in Del Norte County near the Oregon line.*

Such activity requires the services of many specialists; men who are proficient in many fields such as contract administration, paving, earthwork, drainage, materials testing, and surveying. A continuous training program is carried on to provide and maintain this staff.

The total personnel engaged directly in the construction function in the 11 highway districts exclusive of bridges, is about 2,600 in the peak of construction months. This encompasses work on more than 300 major contracts, valued at over a half a billion dollars.

To assist in the uniformity of specification interpretation and construction practices, and provide assistance on special problems, the Headquarters Construction Department performs, as a staff activity, an on-the-job reviewing service of all construction projects.

Construction progress was seriously hampered during May and June by a labor dispute, particularly in the northern part of the State.

### Special Projects

A new contract record procedure was initiated by the Construction Department in July 1961. Headquarters construction personnel held training sessions on the new procedure in the districts and conducted frequent reviews of the procedure in operation in the field. Further improvements in the procedure are being made as a result of these field studies.

The department is also developing a system which will insure a more uniform method of indexing and filing for project control. This system will also furnish supporting data for the new contract record procedure.

The new, completely revised issue of the Construction Manual was published and distributed to division personnel, cities and counties of the State, other state agencies, federal government agencies and to the chief engineers of the other 49 states.

The study of tolerances in the various elements of the structural section of the roadway was continued during the past year. The goal is to determine reasonable tolerances which will accommodate modern, high-speed construction equipment and methods and still satisfy the structural requirements of the design. During the course of the study, there has been a noticeable improvement in the projects covered in the past year over those of the previous year.

### Construction Practice

The slipform method of constructing portland cement concrete pavement was utilized extensively during the past fiscal year. Quality of the finished product continues to show improvement as the equipment is modified and refined and contractors gain experience in its use. During the year, about one-third of the concrete pavement was constructed by this method.





The road winding up the mountainside from left center is the recently completed Angeles Crest Highway in Los Angeles County. Barley Flat recreation area is off to right of photo. Higher level road is a former access road used during highway construction.

Central mixed concrete for portland cement concrete pavement was used on several state highway projects for the first time. This procedure calls for the concrete to be mixed at a central plant and hauled to the paving machine in nonagitating trucks, rather than the conventional method of hauling the dry batches to the mixers in the paving train. Results were very encouraging and more use of this method may be expected.

The trend to more automatic control of crossfall and profile grade obtained with asphalt paving equipment continues from preceding years. As more and more sophisticated automatic control equipment becomes available for routine construction use, uniformity and accuracy of geometric features in completed pavements is being maintained and in instances improved. This result is obtained despite the continuing high rate of construction activity and shortage of highly skilled operators.

Asphalt paving practices during the past year, and before, with respect to



The central mix method of getting concrete to a paving job was used successfully on a section of the San Diego Freeway in the Carson Street-Dominguez area of Los Angeles.



compaction procedures, reflect the effect of revised specification requirements. These requirements arose out of field and laboratory investigations into the effect of various types and degrees of rolling initiated in 1959. In general, it can be stated that asphalt pavements constructed under the current requirements have improved density and impermeability.

#### Honor Camp Projects

The Division of Highways and the Department of Corrections continued the joint operation of Honor Camp No. 37 at Cedar Springs, Los Angeles County; Camp No. 41 near Happy Camp on the Klamath River in Siskiyou County; and Camp No. 42 near Lord Ellis Summit in Humboldt County.

All work proposed for Camp 37 was completed in the late fall of 1961 and the camp facilities were demolished by the end of the fiscal year. Except for

Maintenance of the 14,156-mile state highway system is handled by approximately 3,500 maintenance personnel divided into 60 field superintendents' territories. They are responsible for maintaining California's highways in serviceable condition. The total expenditure for all maintenance work on state highways, including the state highways in 340 incorporated cities, was \$41,845,000 in 1961-62.

#### New Routes Maintained

A total of 132 miles of former county roads and city streets was taken over for maintenance in the 1961-62 fiscal year. Of this total, 90 miles and 42 miles were added to the state highway system by the 1959 and 1961 sessions of the State Legislature, respectively. The location and mileage of these roads follow:

*Shasta and Lassen Counties:* Route 83 near Old Station to Route 29 west of Susanville, 46.10 miles. *Kings County:* between Route 10 east of Hanford and Fresno county line, 8.98 miles. *San Bernardino County:* between the present terminus of Route 187 at East Road in Morongo Valley and Route 218 at Old Woman Springs Road near Yucca Valley, 10.55 miles.

a period during the war years, this camp operated continuously from June 1940 until November 1961. A total of 32.2 miles of roadway was graded at an approximate cost of \$9,000,000.

With the completion of this work, along with various sections built by the Bureau of Public Roads, the Angeles Crest Highway now provides a continuous route from La Canada to the Big Pines and Wrightwood recreation area. In addition, the motorist is now able to drive from Azusa through the San Gabriel Canyon to a junction with the Angeles Crest Highway at Islip Saddle, with completion of the work from Islip Saddle to a connection with the existing Route 62 at Crystal Lake.

Camp 41 continued construction on the nine-mile portion of the Klamath River Highway (State Sign Route 96) between Swillup Creek and Clear Lake. Oiling was completed on a four-

## MAINTENANCE

Also from Route 187 near Yucca Valley to Utah Trail Road in Twenty-nine Palms, 21.74 miles. *Riverside County:* between Route 78 near Aguanga and Route 64 east of Anza, 20.98 miles. *Plumas and Lassen Counties:* from Route 83 near Canyon Dam to Route 29 near Westwood, 11.65 miles. *San Diego County:* between intersection of Route 2 and Wabash Boulevard and junction of Route 77, 12.48 miles.

Snow removal and sanding icy pavements costs approximately \$4,000,000 or approximately 10 percent of the maintenance expenditure.

#### Pavement Repair and Bridge Maintenance

Extraordinary maintenance of the traveled way and shoulders, including work in cities, under specific fund allotments during 1961-62, was \$1,880,000. The cost of restoration of 1,048 miles of traveled way and 1,022 miles of shoulders was \$1,509,000 and included in the above cost. Also included was \$371,000 for seal coat contracts (asphalt and screenings) on 162.25 miles of roadway. Daily operations of a general maintenance type are not included in the above figures.

mile length toward the east end of this section and heavy excavation is in progress in the westerly three miles. Clearing and building of drainage structures have been started in the first mile west of Swillup Creek. Grading was completed (including approaches for the Indian Creek Bridge) for the new road from 2¼ miles west to Happy Camp to 0.2 mile east of town. This section was oiled except for a short distance each side of the new bridge under construction.

Camp 42 continued work on U.S. Highway 299 between Blue Lake and Berry Summit. Of the total of 23 miles proposed, 2.4 miles have been brought to grade and paved, 1.6 miles have been brought to fine grade, 1.3 miles have been brought to rough grade with major stabilization performed; grading and stabilization work were in progress on another 1.2 miles; and clearing was proceeding on other portions.

The annual resurfacing and delayed construction seal coat program totaled approximately \$5,000,000 financed from construction funds and involved some 767 miles of highways throughout the State.

Repairing spalled joints in portland cement concrete pavements was continued by using epoxy resin and concrete aggregate. The use of this material results in opening up the repaired areas with a minimum of delay to traffic.

Repairs to bridges on the State Highway System cost \$630,000 during the fiscal year. This includes \$287,000 under contracts and \$343,000 for work performed by state and city forces.

#### Ferry Operation; Maintenance in Cities, and Roadside Cleanup

The Benicia-Martinez Ferry, across the Carquinez Strait, continued in operation (until September 15, 1962) and during the year carried 111,452 vehicles and 142,185 passengers. The ferry was out of service five days in November 1961 for inspection and repairs. A small ferry operated on an abbreviated schedule for pedestrians during this period.

Despite educational efforts by public service and other organizations throughout the State, rubbish continues to be dumped or thrown on state highways. Removal of roadside litter and street sweeping cost \$1,700,000 during the 1961-62 fiscal year.

#### **Roadside Vegetation, Tree Care and Landscaping**

Roadside vegetation control includes the care of plantings, trees, fire hazard reduction, noxious weed control and the overall care of native roadside grasses and brush.

As of January 1, 1962, special landscape personnel were maintaining landscaped rights of way covering approximately 2,400 acres along 209 miles, functional plantings of ground cover and trees on 1,700 acres along 232 miles, and screen plantings on 242 miles. Landscape and allied maintenance cost \$6,400,000 during the fiscal year.

Service contracts with 32 County Agricultural Commissioners provided control of noxious weeds along State

highways within their respective counties. In other counties highway personnel performed this work when required.

Mechanical and chemical brush control operations continued as a more economical means of controlling roadside vegetation, for fire prevention and to preserve sight distance.

As a more effective fire preventive method, wider treatment strips are now being placed adjacent to improved shoulders instead of a narrow strip farther away from the pavement. This makes it easier to prevent the escape of accidental roadside fires into adjoining flammable areas.

Some 5,000 roadside miles were treated at selected locations to reduce fire hazard. About three-fourths were treated chemically and one-fourth mechanically.

Experimental plots have been established on roadsides in co-operation with the chemical industry, Division of Forestry, University of California, and this department to determine the

effectiveness, the methods and the economy of using plant growth inhibitors to reduce the amount of annual roadside mowing required; also to determine the effective materials and methods of application required for the use of chemicals on roadside vegetation as fire retardants. Landscape maintenance and roadside vegetation control accounted for \$6,000,000.

#### **Lighting, Signals, Electrical Devices**

Another 149 traffic actuated and railroad or fire station pre-empted controller units were installed at intersections, during the past fiscal year, making a new statewide total of 1,479. These electronically operated controllers are used not only for regulating major and minor movements of highway traffic but also the movement of traffic while a train or fire truck has pre-empted the use of an intersection.

Thirty fixed-time controllers were eliminated or replaced during the past

*The new Whitmore Maintenance Station on U.S. 40 east of Baxter will facilitate maintenance work along this important stretch of trans-Sierra freeway.*





fiscal year reducing the statewide total to 578.

Some 81 electrically or electronically operated timers for controlling pedestrian crossing movements at intersections were installed during the past fiscal year making a new total of 1,281.

An additional 2,342 lamps used in highway lighting were installed during the past fiscal year, bringing the statewide total to 22,044. Some 2,260 of these were mercury vapor lamps; 82 were incandescent lamps. No fluorescent lamps were installed. The mercury vapor lamps vary in lumen output from 35,000 lumens to 6,800 lumens; the incandescent lamps from 15,000 lumens to 2,500 lumens and from 1,000 watts to 300 watts.

The number of lighting, signal, and illuminated sign facilities knocked down during the past fiscal year increased by 113 for a new total of 863 knockdowns per year. A knockdown is where a lighting pole, traffic signal pole, signal cabinet, or any other lighting, signal or sign facility is actually knocked down. It also includes situations where the lighting, signal or sign facility is damaged by a car or truck beyond what could be considered as part of regular maintenance. Maintenance of electrical safety devices accounted for an expenditure of \$2,900,000.

#### Communications

Further improvements were made in the division's VHF mobile radio system during the past year in District VI (Fresno) and District IX (Bishop) to increase mobile radio coverage. Additional microwave installations were completed in District I (Eureka), District II (Redding), and District XI (San Diego) to provide multicontrol of remote mountaintop radio stations. The division also used radio communication on 10 major construction projects.

At the end of the fiscal year the Division of Highways was operating 200 land-based radio stations, 35 microwave stations, 100 hand-carry units and 1,200 mobile radio units.

The division continued operation of its leased, automatic, private-line teletypewriter system. This system connects all 11 of the division's district offices and certain other key locations



California National Guard shooting down snow cornices to prevent snow slides on U.S. 50 at Sierra Ski Ranch.



Chain control area in operation at south of Strawberry, U.S. 50.

with Sacramento. The system consists of a total of 20 stations.

The division continued to furnish road and weather information via teletype during the winter months to news media, radio and TV stations, automobile clubs, trucking concerns, governmental agencies, and other concerned organizations.

**Outdoor Advertising**

As in previous years, the regulation of outdoor advertising displays adjacent to the public highways within the unincorporated areas of the State has been administered and financed solely through revenue derived from license and permit fees.

Operations and enforcement activities were carried on at the increased

level projected in 1959 when amendments to the Outdoor Advertising Act provided a necessary increase in the fee schedule.

For comparison, records covering the last three calendar and fiscal years are as follows:

Number of advertising operators licensed for each fiscal year:

1959-60.....	843
1960-61.....	838
1961-62.....	880

Number of permits issued during the calendar year:

	<i>Signs</i>	<i>Structures</i>
1959.....	714	36,425
1960.....	1,115	35,126
1961.....	972	34,357

Gross receipts – license and permit fees and penalties for each fiscal year:

1959-60.....	\$109,180.24
1960-61.....	127,104.25
1961-62.....	124,693.32

**Transportation and Encroachment Permits**

Transportation permits for oversize or overweight vehicles processed during the past fiscal year increased slightly over the preceding period. About 7 percent more permits were issued as a result of 1961 legislation restricting the issuance of annual permits for oversize trailer coaches. The Los Angeles and San Francisco districts, in that order, continued to handle the largest volume of extralegal hauling permits, accounting for some 44 percent of the statewide total. Military certifications handled during the fiscal year increased about 20 percent, averaging about 43 cases per month.

The encroachment permit function experienced a slight reduction of 3 percent, with the two metropolitan districts handling about 50 percent of the total volume.

Following is a comparison of the number of permits issued for both functions during the past three fiscal years:

	<i>1959-60</i>	<i>1960-61</i>	<i>1961-62</i>
Encroachment permits	13,415	13,151	12,778
Transportation permits	92,156	70,306	75,603
Totals	105,571	83,457	88,381

**Truck Scales**

Two new truck weighing stations located at Galivan, five miles north of San Juan Capistrano, have been constructed on U.S. 101. Two new truck scale yards, between Cordelia and Fairfield on U.S. 40, have been completed and are now in operation. These truck weighing facilities are similar to the one located on U.S. 99, north of the Grapevine Canyon portion of the Ridge Route, near the community of Wheeler Ridge. The Highway Patrol is also utilizing these two stations to check brakes.

**Maintenance Stations**

Construction on the final phases of station facilities at Whitmore and Kingvale Maintenance Stations on U.S. 40 in the Sierra is rapidly nearing completion and will be ready for winter. Seven new maintenance sta-



A maintenance crew trim overhanging foliage from a tree along a state highway, one of the many routine maintenance chores that must be performed regularly.





One of the truck-weighing stations along state highways, this one on U.S. 99 north of the Ridge Route with Grapevine Canyon and the community of Wheeler Ridge visible in the background.

tions were placed under contract in Northern California and four were placed under contract in southern California.

#### Striping and Pavement Markings

Placing pavement markings and traffic stripes by state forces on some 14,000 miles of state highways cost approximately \$1,537,000.

The changes in our traffic stripe program initiated in 1961 to conform to the revised *Manual of Uniform Traffic Striping Control Devices for Streets and Highways*, notably the use of yellow striping for no-passing zones, have been practically completed.

Continued use of thermoplastic materials, for pavement markings in both Districts IV and VII indicates that this material will provide a more thorough and lasting stripe in urban areas where restriping under normal procedures disrupts traffic and is rather expensive. Two new striping machines were purchased for the application of the thermoplastic striping in the two large metropolitan districts and surrounding districts.

#### Road Closures

The drought that has plagued the State for the past three years continued through the summer months of 1961 resulting in numerous forest fires throughout the State causing minor road closures. In the early part of November the disastrous Bel Air and Topanga Canyon fires in the Los Angeles area necessitated closure of Sepulveda Boulevard, Sign Route 7, and Topanga Canyon Road, Sign Route 27, for approximately 3½ days. The Pacific Coast Highway, U.S. 101 Alternate, was also closed for a short time to facilitate movement of fire-fighting equipment and evacuees. These extensive brush fires in the Los Angeles area resulted in huge property losses which prompted a disaster area declaration by the Governor on November 6, 1961.

The 1961 calendar year ended with a subnormal seasonal rainfall total and only minor road closures in the higher elevations. The Sierra and Southern California received a heavy snowfall during the first part of January, with snow falling in Southern California

for the first time in years. The Sacramento and San Joaquin Valleys were blanketed with a heavy fog during this period, which caused considerable disruption to traffic. There were numerous accidents on the heavier travelled highways.

Major road closures from this storm occurred on Sign Route 32, Deer Creek Highway; the Emerald Bay Section of Sign Route 89; and Monitor Pass, Sign Route 89. The Los Gatos-Santa Cruz Highway, Sign Route 17, was closed due to snow on January 21 for 15 hours. U.S. 99 over the Ridge Route was closed on January 22 for 24 hours, and intermittent closures were experienced during the next two nights. Other state highways in the southern part of California were closed because of snow and ice conditions.

A series of heavy storms beginning the first part of February brought exceptionally heavy precipitation to most of the State and ended the indications of a fourth dry year. The Los Angeles area was deluged with 8 inches of rainfall in six days and 11

inches over a two-week period. While widespread damage from the heavy runoff resulted in a disaster area declaration by the Governor, state highway facilities were not particularly affected except for minor flooding in the low areas and miscellaneous slides in the mountains.

During February snowfall was recorded for 18 days of this short month in the Sierra. A snow slide east of Echo Summit on U.S. 50 necessitated opening the old Meyers Grade on February 8 as a detour for light traffic. High water in the Russian River at Guerneville on Sign Route 104 closed this route to traffic for one day (February 13). Sign Route 1 south of Big Sur was closed by slides beginning February 10 for 10 days. Sign Route 198 east of Lemon Cove was closed by a large slide for four days beginning February 10. This route was also closed near Lemoore Naval Air Station for a total of nine days beginning February 9. Highway Route 100 was closed for a period of 10 days beginning February 10 due to extensive damage to the Steamboat Slough Ferry during the high-water period.

In March U.S. 50 traffic over Echo Summit was disrupted by a snow slide west of the summit. The road was closed for 37 hours beginning March 7 due to hazardous conditions, while the National Guard was called in to shoot down overhanging snow cornices with a 105-millimeter recoilless rifle. U.S. 50 approximately one-quarter mile east of Echo Summit was also closed by a large rock slide for one day, March 31.

#### Slides and Storm Damage

The storm pattern during fall and winter of 1961 shifted from north to south, with the result that slide and storm damage in the northern part of the State was below normal. The storm intensity in the southern part of the State resulted in severe damage, while the slide and storm damage throughout the State was below normal. A minor slipout occurred in the westbound lanes just east of the Whitmore Maintenance Station on U.S. 40 in Placer County and corrective measures are in progress.

#### CLOSING AND OPENING DATES ON MOUNTAIN HIGHWAYS

Route	Name	Closing date	Opening date	Length of time
SR 89	Lassen Loop	11-20-61	5-30-62 *	192 days
SR 89	Luther Pass	1-19-62	2- 1-62	13 days
		2- 9-62	3- 9-62 †	28 days
SR 88	Carson Pass	11-19-61	6- 7-62	200 days
SR 4	Ebbetts Pass	11-19-61	6- 1-62	194 days
SR 108	Sonora Pass	10-26-61	5-25-62 ‡	211 days
SR 120	Tioga Pass	11-19-61	5-23-62 §	186 days
SR 89	Monitor Pass	1-20-62	4-26-62	96 days
SR 89	Emerald Bay Section	11-30-61	1- 6-62	37 days
		1-18-62	4-18-62	90 days
SR 120	Big Oak Flat	11-20-61	4-20-62	152 days

\* Temporarily closed five days in October.

† Temporarily closed for one day in March.

‡ Temporarily closed for four days in October and three days in May and June.

§ Temporarily closed two days in May. Tioga Pass in Yosemite National Park is maintained by the National Park Service.

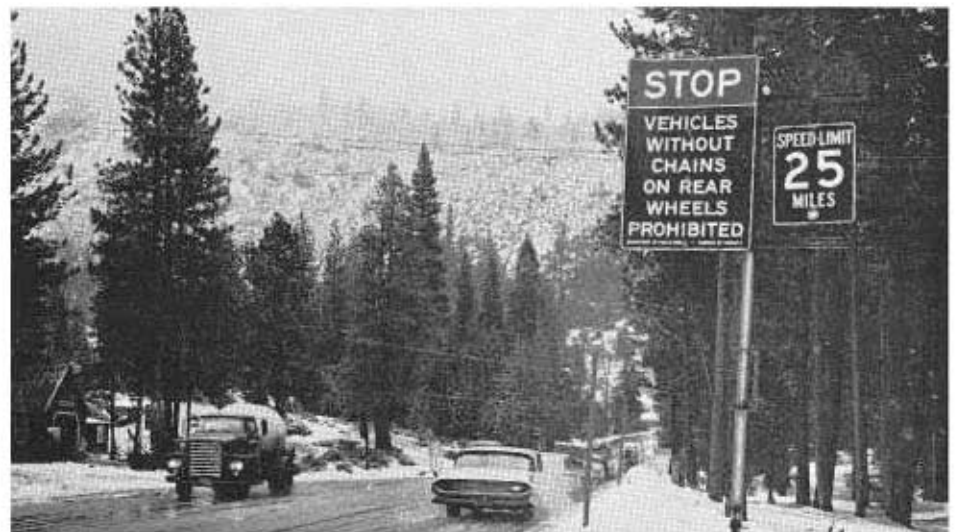
#### Snow Removal

The subnormal storm pattern continued throughout the summer and early fall of 1961. An early snow storm during the latter part of October temporarily closed the major mountain passes. A series of late November storms resulted in above normal precipitation and heavy snowfall in the Sierra, with some 38 inches of snow on the ground at Donner Summit. However, the bad weather did not continue during the month of December, and the snow pack on Donner Summit had diminished to a mere 23 inches at the end of the year.

It was not until February 6 that a major storm covering the whole of the State brought heavy snowfall in the mountainous areas. During this storm blizzard conditions existed throughout the Sierra, and it was necessary to re-

strict travel due to poor visibility and drifting snow. The high winds caused drifting snow which built up cornices on the eastern slopes. This resulted in a snow slide just east of Donner Summit on March 1 in which a large cattle truck and trailer was swept over the bank. Approximately 75 head of cattle had to be destroyed as a result of this accident. There was 108 inches of snow on the ground on Donner Summit at the end of February. At the end of March an 85-inch snow pack remained at Donner Summit as compared with a 34-inch pack the previous season. A maximum snow pack of 135 inches was recorded on March 2.

Sanding operations during the next winter season will be implemented by the addition of a number of new sand houses constructed at critical locations on the state highway system in mountainous areas.



Advance signs chain control area Twin Bridges on US 50.



## MATERIALS AND RESEARCH

The work assigned to the Materials and Research Department is carried on in five sections: *Administration and Services*, responsible for the general operation and supervision of the physical facilities of the laboratory and certain engineering services; *Foundation*, responsible for major foundation exploration; *Pavement*, which tests materials in the upper three feet of the roadbed; *Structural Materials*, is responsible for the inspection and release of all highway materials prefabricated and delivered to the highway projects; and *Technical*, primarily concerned with cement, concrete and chemicals.

The types of work fall under four general classifications: standard procedures or routine testing, special investigations, research, and training.

### Standard Procedures or Routine Testing

The routine work of the laboratory consists of all the tests and inspections required to determine if highway materials are suitable for use or comply with specifications. Approximately 50 percent of the department's work falls into this category.

The number of aggregate samples received and processed during the year increased 8 percent over the previous year. A total of 5,450 aggregate samples were received. Approximately 10,900 samples of asphalt were tested in the department's three asphalt laboratories located in Sacramento, Los Angeles and Bakersfield.

Most of the asphalt paving mixtures, base, and subbase samples are tested in the 11 district laboratories. However, in order to comply with federal requirements, a certain amount of the testing is required in Headquarters laboratory. Approximately 4,350 tests were performed in all.

During the year, 9,000 control tests were made on samples representing 2½ million barrels of cement to determine compliance with specifications. From structural concrete placed in highway structures and Division of Architecture buildings nearly 14,500 concrete cylinder specimens were tested for compressive strength. Large quantities of fabricated and manufactured products were tested, including

nearly 2,000 tests made on the materials listed below:

Concrete pipe .....	423,447 linear ft.
Clay pipe .....	93,737 linear ft.
Steel pipe .....	412,578 linear ft.
Miscellaneous iron and steel .....	9,356,072 lb.
Treated and untreated timber .....	272,023 board ft.
Expansion joint filler .....	475,969 sq. ft.
Rubber waterstop .....	67,836 linear ft.
Corrugated metal pipe .....	544,786 linear ft.
Structural steel .....	75,692,779 lb.
Reinforcing steel .....	245,851,191 lb.

Numerous routine tests were made also on prestressing steel, structural steel, expansion joint, waterstop, bridge pads, barrier cables, electrical conductors, transformers, ballasts, traffic lamps, luminaires, and reflective tests were made on reflectors, reflective sheeting and tile. Miscellaneous items such as signs, traffic cones, porcelain enamel sheeting, reflector buttons, baked enamel sheeting, guide post plates, flagging, and even waterbags were tested to determine compliance with state specifications.

Source inspections were made in all areas of the State and assistance and



A fluorescent lamp being installed for testing in the integrating photosphere. The sphere is quite unusual, as there are only two or three others in the country which approach this unit in size.

consultation service was given to various construction engineers.

Exploratory borings, both vertical and horizontal, were made at many locations throughout the State—5,255 feet of hole were drilled for foundation investigations, 5,425 feet for cut slope designs, 370 feet for landslide correction, 2,100 feet for ground-water studies, 876 feet for materials site investigations, and 276 feet for other state agencies. A total of 9,283 lineal feet of horizontal drains were installed at three different locations. Embankment foundation reports were issued on 11 projects in 3 districts and a water tower study was made for 1 district.

In connection with foundation studies, 270 consolidation tests, 1,000 unconfined compression tests, and 325 triaxial shear tests were made on projects that were explored with Headquarters' drilling equipment. The geology unit made seismic investigations and geologic studies and gave recommendations for cut slope designs for a number of major projects.

Another major facet of the Materials and Research Department's routine operations last year was the record sampling and testing of completed work. This accounted for 2,500 aggregate samples from 142 different projects. 1,563 individual audit samplings representing 1,113 lane-miles of con-

struction were taken. At each sampling location thickness measurements of each element of the structural section were made and the materials were tested to confirm their compliance with the specifications.

The primary function of district laboratories is to develop materials sites, determine the character of soils to be excavated and used along highway alignment, determine fill slope designs, recommend foundation drainage systems, and perform control tests to determine compliance of contractor-produced materials with the job specifications. The division's 11 districts performed a total of 166,336 record tests on soils and aggregates last year.

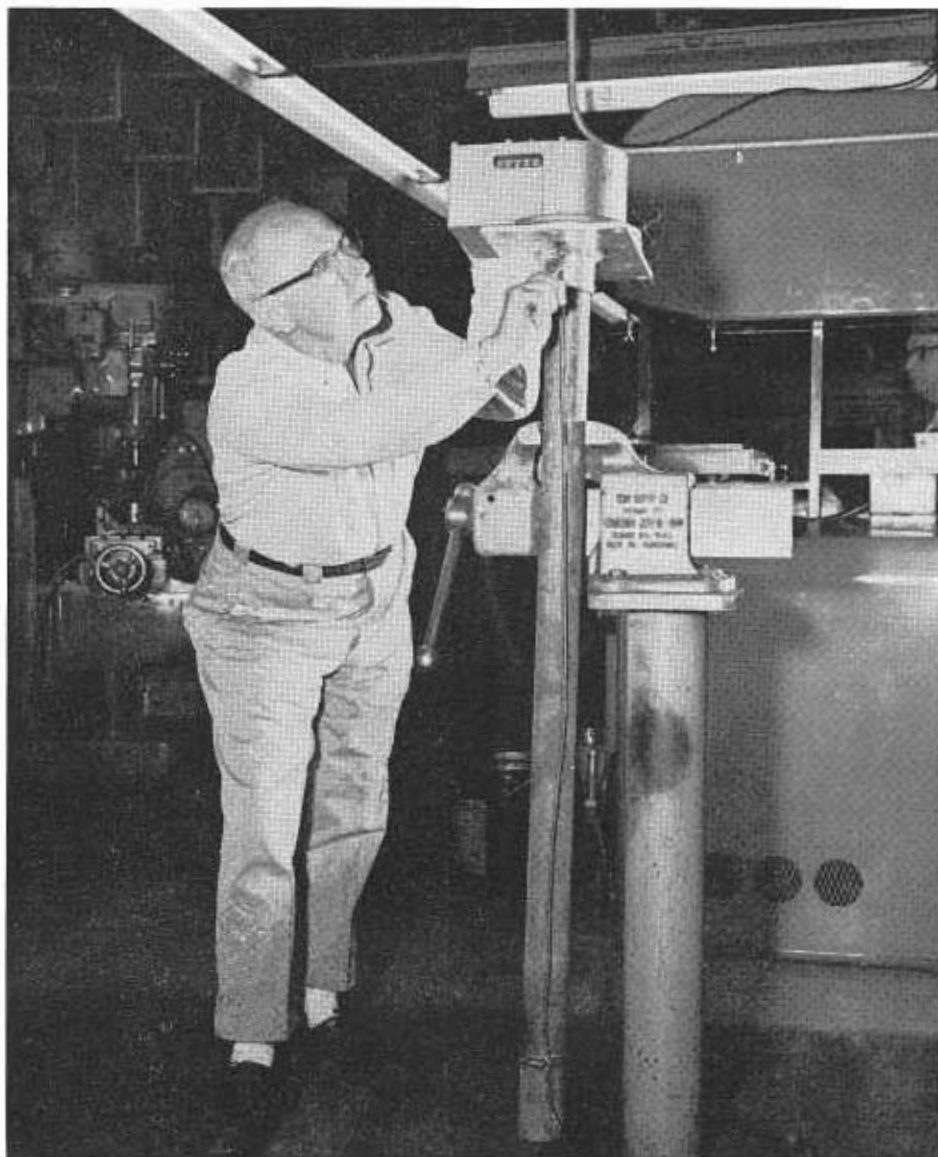
#### Special Investigations

Studies using the traveling deflectometer to measure pavement deflection under a 15,000-pound axle load were made on 30 projects totaling 171 miles. From these data recommendations were made concerning reconstruction and thickness of layers needed.

Several projects were investigated to determine the cause and extent of road distress. One investigation was made concerning the movement of concrete slabs. On another project a study was made to determine the cause of aggregate degradation. In still another case an investigation was made to determine the cause of asphalt flushing on certain roads in desert areas, and several times during the year studies were made using the skid tester, designed by this department, to determine skid resistance at specific locations.

A number of investigations were made to determine the cause and extent of distress in various concrete structures. A study was made on the effectiveness of epoxy paints as a tunnel lining coating; new methods of cleaning soot on ceramic tile in tunnels were investigated and a study was made of the efficiency of the vent system in the Posey Tube using titanium chloride and ammonia vapors to determine the direction of air currents.

The loss of stress in posttensioned strands and various other problems in connection with prestressed concrete fabrication and construction were the subjects of study; sound level studies



The first of its kind to be built, this water load counter was designed by the Materials and Research Department for installation on water trucks used in highway construction.





*An inspector checks concrete beams, which have been subjected to wet and dry cycles and long-term exposure in soils containing high percentages of sodium sulfate. The beams, tested in co-operation with the Portland Cement Association, have been in the "duck pond" since 1945.*

in buildings and at various freeway locations were made; corrosion of reinforcing steel was studied at various locations; and problems related to fabrication of welded steel structures were the subject of still other investigations.

#### **Research**

During the past year research, involving materials from over 200 sources, was completed on the development of a test method for measuring the resistance of aggregate to degradation. Studies were conducted using nuclear equipment for determining moisture and density in fills. Work continued on a study to investigate the possible aid to the compaction of the fills through the use of wetting agents. Work also continued on the experimental sand drain fill at the west approach to the Napa River Bridge. A simplified type of foundation deformation device was developed to indicate when a foundation soil starts to move in a horizontal direction. The

device, called an inclinometer, has proved successful in indicating when fills constructed upon poor foundations become unstable. The installation of inclinometers is now routine where stability is of concern.

A field and laboratory study has been continued to learn more about the relationship between wear and polish of pavement surfaces and skid resistance. Rejuvenation agents for asphalt pavements have been the subject of one new study and research was begun on an experimental section of a heavily traveled road in District X to evaluate the effect of adding asbestos fibers and limestone filler dust to asphalt concrete.

The work of correlating laboratory research resilience tests with field performance was continued over the past year and, as a part of the long-range asphalt durability study, a followup survey of the Zaca-Wigmore test section in Santa Barbara County was made.

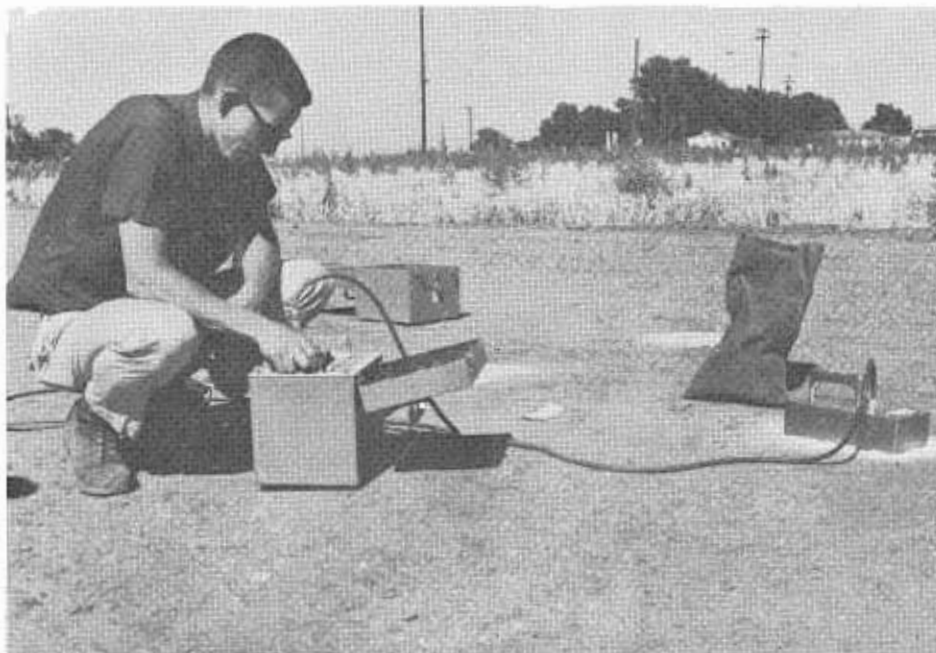
The effect of various amounts of chloride ion on California cements is the subject of a current research project. In another cement research project work was completed on the development of a test to limit the contraction and expansion properties of California cement. The requirements of this latter test have been incorporated into the specifications.

The laboratory's truck-mounted profilograph was modified to record two wheel tracks simultaneously, thereby reducing the amount of time necessary to obtain pavement profiles. At the same time cross-slope and longitudinal grades can also be measured and recorded.

A new piece of equipment known as the linear transverse machine has been installed and will be used to determine the amount and distribution of air entrained in concrete. New traffic paint formulations and thermoplastic hot-melt materials for traffic stripes have been investigated. The



*Thermoplastic striping unit placing crosswalk markings.*



*Before a new device or testing unit can be adopted for general use, its relative merits and capabilities must be evaluated. Here a nuclear device for measuring soil density is being tried to determine its reliability for compaction control work.*

study of reflective pavement markers was continued as was the effort to learn more about the effects of dew condensates on the corrosion of painted structural steel surfaces.

A test program evaluating new designs for bridge deck expansion joints was initiated. In addition several experimental installations were made using new joint sealants for bridge decks. The use of roller bearings in bridge bearing assemblies was investigated, and tests were performed to determine the shear resistance of bolts and face plates cast in reinforced concrete. Preliminary work was done on the instrumentation of the Webber Creek Bridge spans in El Dorado County to determine stresses and strains for future use in design and specifications.

Work was started on the development of an instrument to evaluate riding qualities of pavements by measuring the responses of both vehicle and passengers to different road surfaces. Several new types of signal and lighting equipment were tested and rated.

A new test was developed which predicts the service life of underground pipe from environmental factors (pH and soil resistivity). This test is now in use by all districts. A new test method was developed to measure the service life of concrete piles, based upon certain relationships between factors such as cement and water content, thickness of concrete cover over reinforcing steel, etc., and the corrosion potential of the reinforcing steel. Test installations of aluminum culvert pipe for comparative corrosion tests were completed and periodic observations were started.

Continuing investigations were made on new sign and marker materials. Welding tests were conducted and analyzed to relate the fillet weld bend test to shear strength of welds. Investigations continued on the ultrasonic testing of fillet welds. Research to solve problems concerning the use of new low-alloy high-strength steels was instigated.

#### **Training**

Last year 70 Division of Highway engineers and four county engineers attended the Materials and Research Department's training course "Procedures, Testing Methods and Use of



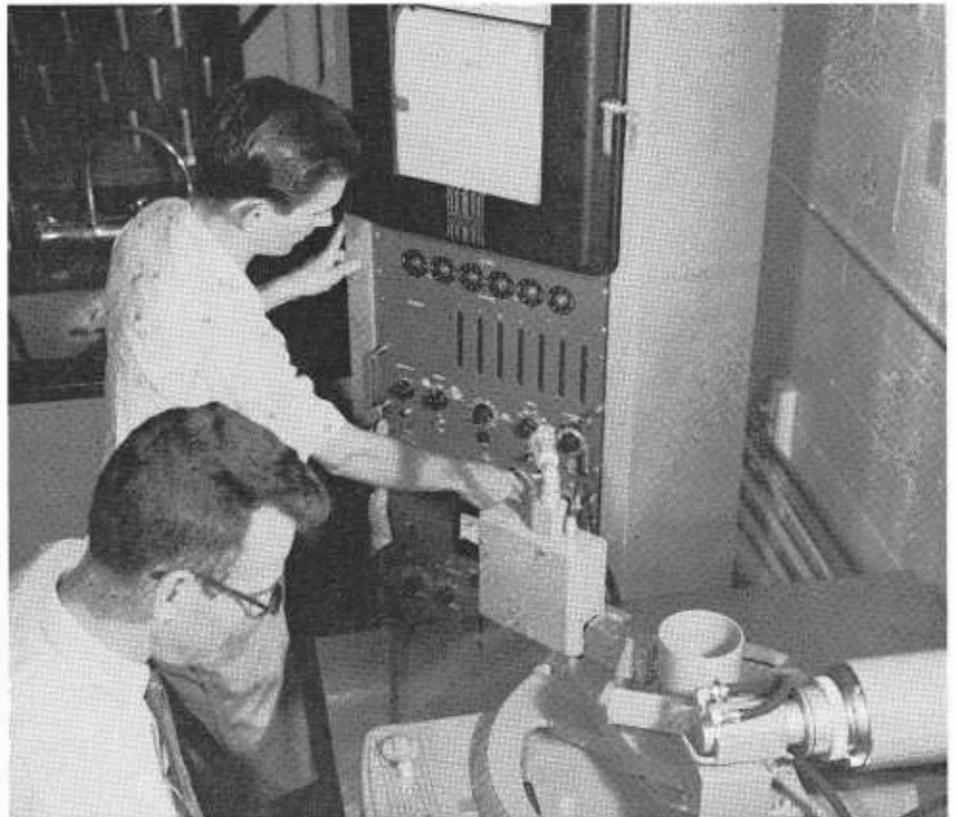


"Undisturbed" tube samples of soil are carefully sealed and labeled in the field for shipment to Headquarters Materials and Research Department Laboratory.

Materials for Highway Purposes." Six Bureau of Public Roads engineers also took the course. In addition to the formal training course special tours and training courses were arranged for 116 visitors, 51 of them engineers from 20 foreign countries.



Linear traverse device used in determining the entrained air content of hardened concrete.



The X-ray Diffraction and Spectroscopy Unit is employed in the analysis of soils, cements, paints, alloy steels, and a number of other items. Often trace elements amounting to one part in 10 million can be detected.

## EQUIPMENT

The Equipment Department's primary responsibility is the acquisition, maintenance and eventual disposal, when obsolete, of the automotive and construction equipment required by the California Division of Highways for its steadily increasing workload. This fleet at the end of the 1961-62 fiscal year was comprised of a total of 9,400 units, composed of 6,075 automotive and 3,325 construction units.

The Equipment Department's operations are financed by a uniform system of equipment rental, charged to the department or district using each unit. The rental rate assessed each unit of equipment is based on its first cost, maintenance cost expectancy and a proper proportion of administrative overhead. These rental charges, plus the funds derived from the sale of retired equipment, usually cover the cost of replacement. Rental rates are a subject of constant review to keep them realistic and appropriate.

The physical plant consists of 12 major shops and 14 subshops serving the needs of the 11 highway districts and the Division of Highways Headquarters. These shops also handle certain special work, such as maintenance and repair of movable span bridges, pumping stations, state-owned ferryboats, light plants and other miscellaneous items as required by the Operations Department. Field forces are provided to accomplish emergency repairs on the road.

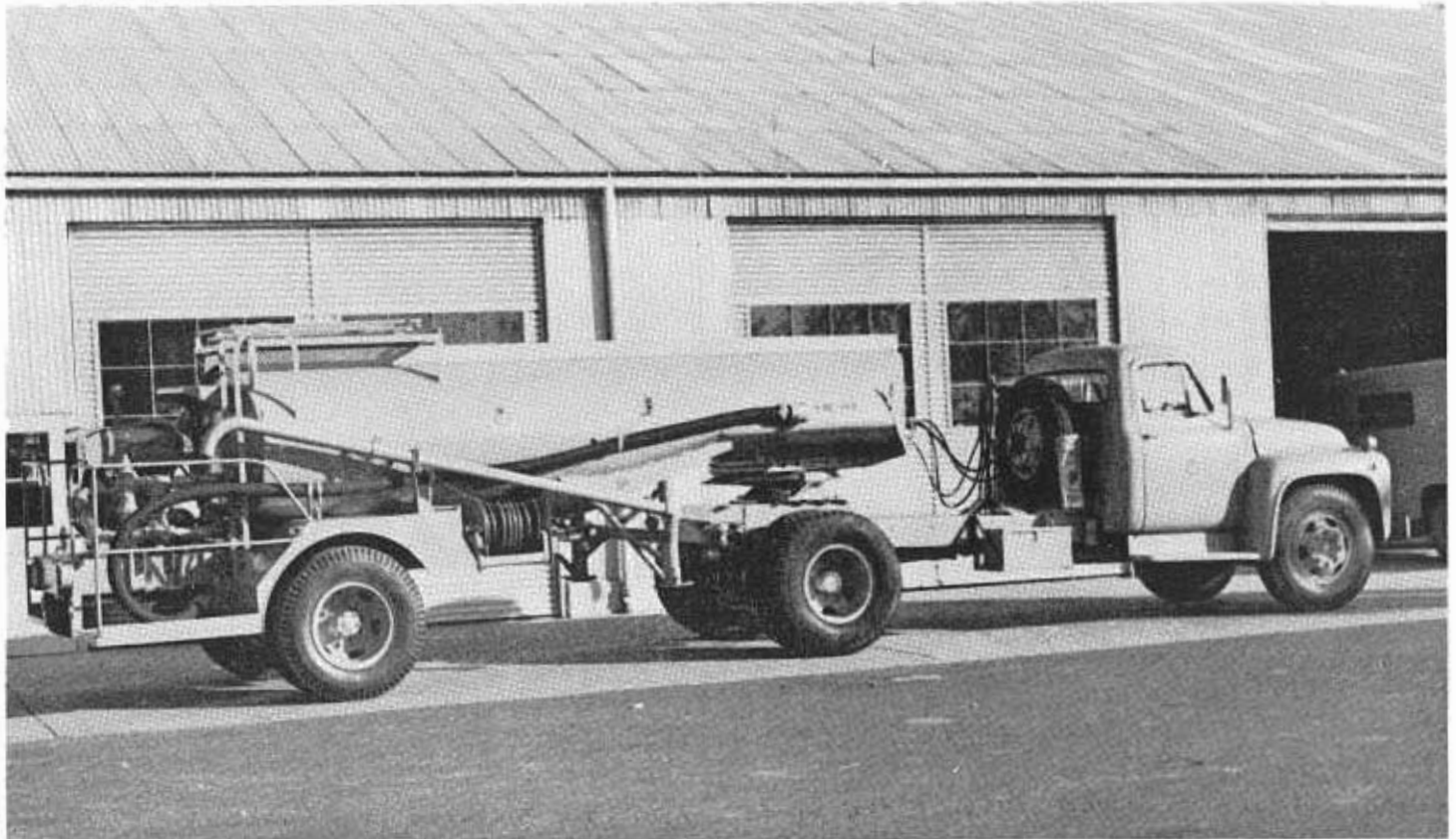
### Equipment Design and Construction

Changing conditions require constant updating of methods and additional specialized equipment. When this equipment is not available on the open market, it is designed and constructed by the Equipment Department in collaboration with the districts or other departments. The Equipment Department has a design section for designing improvements to existing equipment and standardizing new equipment.

During the past year loaders have been standardized in regard to weight, horsepower, bucket and crane capacity to take better advantage of competitive bidding. The tree trimmer, cargo special, and cargo trucks have been modified to provide standardized accessories on all units.

Rising wage costs have emphasized the need for more efficient equipment. Increased roadside planting requires water trucks capable of watering planted areas at a rapid rate. During the past year, this need was filled by the development of both 4,000-gallon and 2,000-gallon semitrailer units. These units are equipped with pressure pumps, spray bars, hose and other auxiliary equipment to permit their operation by one man. The basic pieces of equipment were originally aviation gasoline-dispensing units acquired through federal surplus at a considerable saving.

During the past year, the Maintenance Department has found through



A 2,000-gallon semitrailer watering unit constructed at the headquarters shop from a surplus gasoline tanker.



experiments that, where the average daily traffic volume is high, thermoplastic material provides more economical pavement markings than the conventional traffic lacquer. Commercial applicator units were available on the open market, but it was necessary to develop a self-contained unit capable of carrying the applicators, heating and mixing tanks and necessary supplies for continuous operation.

The design section has also completed the modification of a smaller self-propelled traffic line marker. The basic unit was constructed by an equipment manufacturer and an additional paint gun, bead valves and boxes were added. Two of these units are now in service.

During the past year the Equipment Department has written specifications for 424 different types of equipment. Specifications are written in a manner to permit the various manufacturers to compete in bidding. Purchases of similar units are consolidated to permit volume purchasing with resultant savings. During the past fiscal year, \$5,224,937.43 was expended in acquiring both additional equipment, improvements, and replacement equipment.

The Equipment Department disposed of 1,084 obsolete units by sealed bids, during the 1961-62 fiscal year, for a total of \$370,000. This amounts to approximately 20 percent of the original cost of these units.

#### Procurement

During the 1961-62 fiscal year, the procurement section handled 29,100 requisitions and subpurchase orders amounting to \$7,637,018.21. Of this amount, \$4,130,000 was expended for parts, materials and supplies. In an effort to reduce overhead costs, this section has installed systems of volume purchases. The intershop catalog, showing the inventories of all critical and hard-to-obtain parts, has led to a reduction of the parts kept on hand. It has also provided flexibility in obtaining them when and where needed. A complete library of the latest manufacturer's parts catalogs and service manuals covering all Division of Highways equipment is maintained at each



A maintenance worker repairs a lamp on a freeway from one of the division's rotary brush sweeper and giraffe units.

Equipment Department shop for ready reference.

The Division of Highways, through the Bureau of Public Roads, has been granted a high priority for obtaining surplus items from the U.S. General Services Administration. Many of the shops have obtained equipment and supplies at a small percent of their original cost from this source. The Headquarters machine shop has been equipped with many machine tools acquired from the federal government at a small fraction of their first cost.

Certain employees of the Equipment Department, licensed by the Division of Industrial Safety, inspect all of the division's pressure vessels and issue certificates permitting their use if in satisfactory operational condition.

#### Buildings and Plants

The modernization program at Headquarters Shop, which included

additional office space, a new truck shop and additional area in the automobile repair shop, was completed during the past fiscal year. An additional one-half acre of land was acquired adjacent to the spray booth and storage building for needed equipment parking area. This will allow full utilization of the repair areas rather than their use for temporary equipment storage. Volume purchasing of units for stock and off-season repair of heavy equipment necessitates an area for temporary storage of these units at Headquarters Shop.

Construction was started for new subshops at the Central Maintenance Station in District VII, Los Angeles; at Burney, District II; and at Fairfield, District X. Construction of these subshops should be completed during the 1962-63 fiscal year and will provide more economical repair operation in these areas.

The existing facilities at Shop 4, Oakland, consist of a restricted plant area which has been in service since 1920. This plant is too small for the existing workload and there is no possibility of further expansion. During the 1961-62 fiscal year, an eight-acre site was purchased in the City of San Leandro fronting on First Avenue and 1,000 feet west of Merced Avenue. Design and construction of a new shop is scheduled on this property during the 1962-63 and 1963-64 fiscal years.

At present Shop 3, Yuba City, is located in a rented building which is inadequate. Major repairs for Shop 3 are handled at Headquarters Shop in Sacramento, at considerable outlay of time and money. Land has been acquired, and design and construction of the new facility is scheduled for the 1962-63 fiscal year.

#### Research and Training

The research and training section investigates problems involving equipment operation and construction, the use of fuels and lubricants, and the preparation of lubrication manuals and charts. It also supervises an extensive program of training for employees of the Equipment and Maintenance Departments.



Investigations included problems on tractors, loaders, brush cutters, mowing machines, traffic strippers, and many other types.

Special training programs given during the year included automatic transmissions and mechanical features of equipment operation. Opportunities for employees to take training on their own time are continually investigated and recommended.

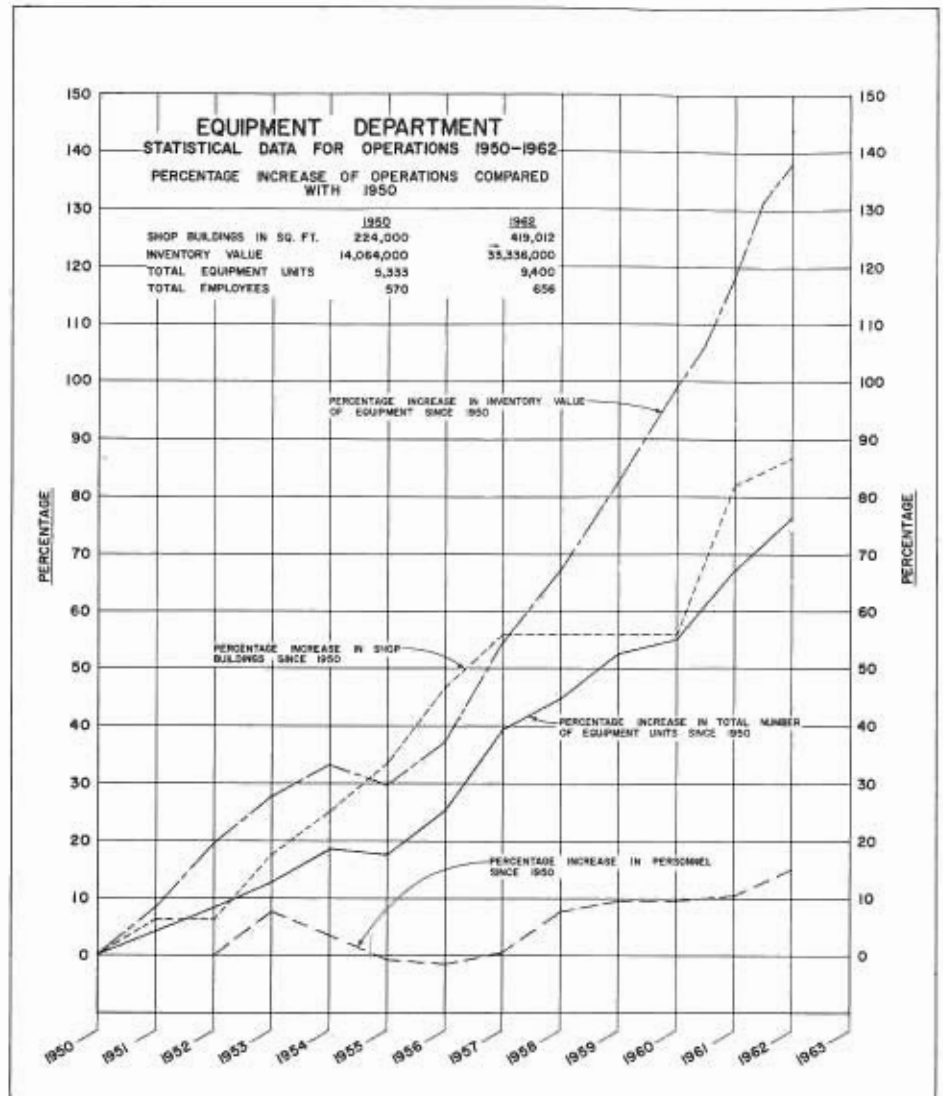
In 1953 a program of training operators of equipment in proper lubrication and preventive maintenance was established by the Equipment Department. This is a continuous program and is conducted with the co-operation of the Maintenance Department.

**Statistics Section**

A statistics section is maintained for the purpose of analyzing costs and adjustments of the rental rate of equipment units. Rental is charged to the operating department for the use of the various units and provides for the cost of administering, depreciation, and repair of equipment. The latest revised rental schedule was placed in effect on July 1, 1962. This system of handling the costs of equipment was established to insure that all costs are equally distributed to a particular road section or project. The Equipment Department's cost accounting system has been adopted by many other highway departments within the United States and in foreign nations.

**Summary**

During the past 10 years, the Equipment Department's operations have grown with the increased workload of the Division of Highways. The accompanying diagram shows this growth. During this period repair costs per vehicle per year have been reduced \$92 per unit. The total cost of repairs in the last 10 years has increased 33 percent, while the total increase in equipment value for the same period has been 138 percent. Operation economies, improved purchasing methods, standardization of equipment and specification improvements have resulted in providing the operating departments with better equipment at lower cost.



**EQUIPMENT DEPARTMENT SUMMARY**

	June 30, 1961	June 30, 1962
Equipment repairs	\$3,792,216.82	\$4,018,794.70
Miscellaneous expense	633,685.38	645,884.61
Administration and other expense	1,048,065.57	1,047,247.95
Depreciation expense	2,819,928.05	3,361,477.72
<b>Total expense</b>	<b>\$8,293,895.82</b>	<b>\$9,073,404.98</b>
Total income	\$8,222,445.00	\$9,163,801.60
1961-62 Over	-	\$90,396.62

*Inventory:* The original investment in equipment is as follows.

**TRUCKS AND PASSENGER VEHICLES**

All trucks, 1/2- to 10-ton	\$13,733,822.81
Buses, jeeps and station wagons	401,532.01
Passenger automobiles	3,680,327.09

**MAINTENANCE AND CONSTRUCTION EQUIPMENT**

Motor graders	\$4,207,835.90
Rotary snowplows (truck mounted)	1,546,481.91
Rotary snowplows (motor grader mounted)	131,649.71
Shovels, power	409,501.28
Loaders	2,177,124.60
Tractors	752,670.78
Snowplows, push	696,215.45
Compressors	340,127.70
Miscellaneous - other equipment, rollers, mixers, trailers, pumps, drills, mowers, etc.	5,258,710.89
<b>Total</b>	<b>\$33,336,000.13</b>



# • Administration

- *The Assistant State Highway Engineer, Administration, exercises control over the following: office engineer; federal-aid secondary and county co-operative projects; city and co-operative projects; service and supply; management analysis; and systems research*

## OFFICE ENGINEER

The office engineer is responsible for a wide range of administrative activities chief of which are: preparation, review and processing of plans, estimates, and bid and contract documents; budget and expenditure control; administration of federal funds; industry contacts; bidder prequalification records; reports and statistics; mail and general files.

### Budget and Project Control

Engineering control of the state highway budget involves procedures to insure that provisions and amounts specified in the budget are observed; preparation and processing of contract documents; preparation of final documents submitted to the California Highway Commission; issuance of work orders; and maintenance of construction records.

*Taylor Boulevard, a new Contra Costa County freeway near Concord, constructed under the federal-aid secondary and F.A.S. urban extension programs.*



During the year, 419 financial votes were prepared for commission action; 565 projects were advertised for bids with an estimated cost of \$332,902,600; and 543 projects were determined to be satisfactory for contract award.

In addition to the major contract work, the financing of 290 minor and informal contracts, with a total value of \$517,300, was cleared.

### Plans and Estimates

This unit is responsible for the review and co-ordination of plans and specifications to assure they are in agreement before projects are advertised for bids. A backlog of reviewed projects is maintained so that all funds may be obligated without delay when they become available. Estimates of cost on all projects are reviewed at various stages before the opening of bids and, whenever necessary, the estimates are adjusted to bring them into line with prevailing construction costs. Materials information brochures are prepared and made available to bidders.

Draftsmen assigned to this unit prepare maps for all projects, prepare summaries of bids received, and draft sketches. They also perform work for other state agencies. They prepare the map included in the annual report supplement.

The recently adopted project record-consolidated status estimate form used in conjunction with the progress and payment of all regularly advertised contracts is also prepared by this unit. Monthly estimates, varying during the year from 297 to 391, depending on the number of contracts under way, are checked and processed, as are contract change orders. On June 30, 1962, there were 391 contracts valued at \$666,559,200 under way.

### Specifications

Specifications were prepared for 570 projects during the year. Specifications also were prepared for future projects to expedite advertising for bids when funds are available.

The Division of Highways Standard Specifications for highway projects, placed in use in January 1960, are being revised to include late improvements in construction methods, ma-



materials and equipment. The revised specifications are expected to go into effect early in 1963.

#### Reports and Statistics

The reports and statistics unit maintains statistical records of highway construction contracts awarded, which numbered 543 during this fiscal year. Records are kept for preparation of the quarterly California Highway Construction Cost Index, and forecasting future materials requirements. Weekly and monthly reports for management purposes also are prepared showing the value of budgeted and nonbudgeted programs, and of other projects for which bids are received. This unit also compiles the Statistical Supplement to this report.

The contracts placed underway during 1961-62 covered 1,571 center-line miles of state highway, including resurfacing. The Department of Public Works awarded contracts for construction on 165 miles of federal-aid secondary county roads.

#### Prequalification of Contractors

Prequalification is required of all contractors who bid on state highway projects estimated to cost more than \$50,000. The prequalification rating, representing the maximum bidding capacity for each of the several types of work which a bidder is capable of undertaking, is established from a review of each contractor's statement of experience and financial condition.

The total number of contractors prequalified to bid on all types of state highway construction decreased from 913 on July 1, 1961, to 860 on July 1,

STREET AND HIGHWAY MILEAGES			
Highway and street mileages, with which the Division of Highways is directly or indirectly concerned, are shown below:		Federal-aid interstate system (included in above)	2,178
	Miles	Federal-aid secondary system (6-30-62)	
	Miles	On state highways	3,922
		On county roads	8,215
		Total	12,137
Total state highway system (including portions of city streets and FAS system)	16,355	County primary road system (6-30-62)	24,595
Highways proposed for construction where roads do not exist	2,226	Other county roads (6-30-62)	45,433
Constructed state highways	14,128	Total county maintained system	70,028
Federal-aid system		City streets (estimated 12-31-61)	31,599
Primary rural (12-31-61)	7,980	City streets on state highway system	1,734
Primary urban (12-31-61)	1,502		
Total	9,482		

1962. This decrease is primarily due to the discontinuance, beginning January 1, 1961, of prequalification requirements for bidders on projects estimated to cost \$50,000 or less.

The combined bidding capacity of the 860 prequalified contractors is \$2,617,750,000. This is \$182,310,000 more than a year ago.

The number of contractors prequalified by the Division of Highways on June 30, 1962, arranged by the several brackets of bid ratings, was as follows:

Rating	Number of contractors
\$10,000,000 and over	81
5,000,000 to \$10,000,000	144
2,500,000 to 5,000,000	232
1,500,000 to 2,500,000	306
1,000,000 to 1,500,000	373

Rating	Number of contractors
500,000 to 1,000,000	522
250,000 to 500,000	688
100,000 to 250,000	823
50,000 to 100,000	860

#### Bids and Bidders

The average number of bidders per project during the year was 5.4, practically unchanged from last year's level of 5.5. The highest monthly average of 6.8 was in December 1961. The low of 4.3 was in June 1962. The contracts awarded during the fiscal year have been arranged in eight value ranges as shown in the accompanying "Contract Value Range" table.

#### Construction Cost Index

The California Highway Construction Cost Index reflects changes in

#### STATE HIGHWAY MILEAGE BY SURFACE TYPE

TYPE	NORTH			SOUTH			TOTALS		
	Outside cities	Inside cities	Total	Outside cities	Inside cities	Total	Outside cities	Inside cities	Grand Total
Concrete	512.131	164.537	676.668	542.612	367.875	910.487	1,054.743	532.412	1,587.155
High bituminous	4,231.078	499.511	4,730.589	3,466.042	603.527	4,069.569	7,697.120	1,103.038	8,800.158
Low bituminous	1,404.340	29.640	1,433.980	839.131	8.427	847.558	2,243.471	38.067	2,281.538
Oiled earth, gravel	594.650	.714	595.364	641.352	4.329	645.681	1,236.002	5.043	1,241.045
Graded and drained earth	37.737		37.737	23.162		23.162	60.899		60.899
Bridges	71.038	32.673	103.711	31.263	22.719	53.982	102.301	55.392	157.693
Totals, constructed road	6,850.974	727.075	7,578.049	5,543.562	1,006.877	6,550.439	12,394.536	1,733.952	14,128.488
Unconstructed road	1,152.684	142.463	1,295.147	700.041	231.186	931.227	1,852.725	373.649	2,226.374
Total highway system	8,003.658	869.538	8,873.196	6,243.603	1,238.063	7,481.666	14,247.261	2,107.601	16,354.862



### CONTRACTS BY TYPE

This tabulation gives the number of contracts with mileage by types awarded during the 1961-62 fiscal year.

Number of contracts		Centerline miles
35	Portland cement concrete	140.7
179	Asphalt concrete	1,191.8
3	Road mix	3.9
15	Seal coat	245.0
1	Grading	0.2
68	Traffic signals and lights	-
39	Bridges	-
114	Miscellaneous	-
454	Total	1,571.6

### NOT ON STATE HIGHWAY SYSTEM County Roads—Federal-aid Secondary

Number of contracts		Centerline miles
40	Asphalt concrete	127.6
4	Road mix	11.7
3	Seal coat	11.8
2	Grading	13.8
8	Bridges	-
27	Miscellaneous	-
84	Total	164.9

### STATE PARKS, ETC.

Number of contracts		Centerline miles
5	Miscellaneous	-

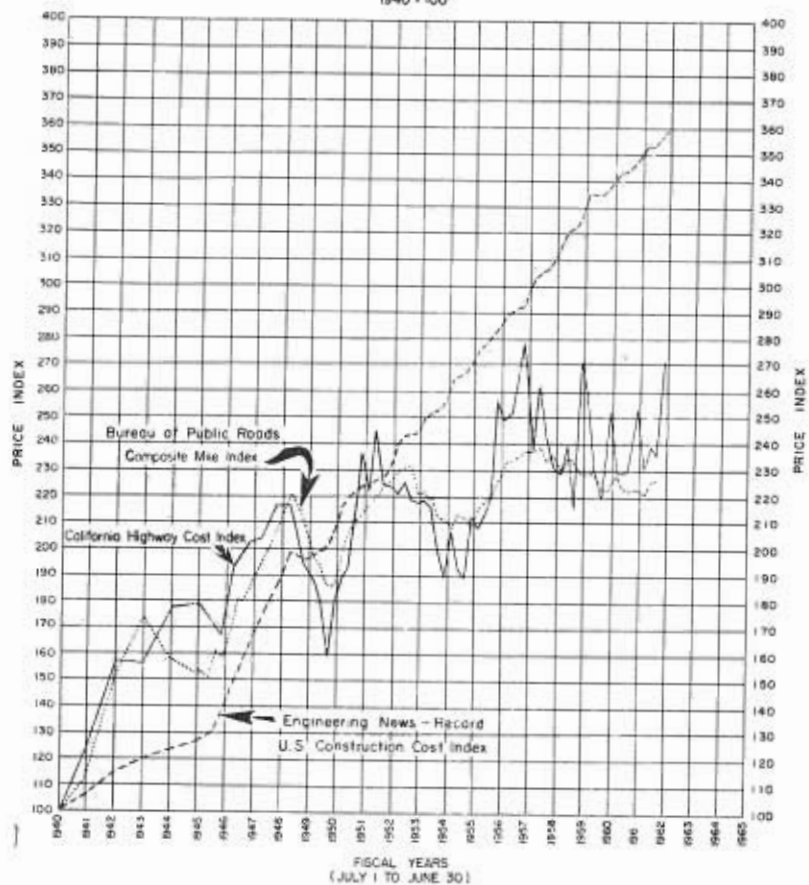
highway construction costs. The index is founded upon weighted average contract prices for seven principal construction items in place, all referred to the base year of 1940 with a value of 100.

The fiscal year began with an index value of 230.5 in the third quarter of 1961, increased to 238.5 the following quarter and dropped slightly to 235.7 during the first quarter of 1962, maintaining the trend of stable prices which started in 1959.

The index, however, rose sharply during the second quarter of 1962 to 271.1. This was partly due to increases in materials and wages in the construction industry which previously had been absorbed by stronger competition and higher productivity. Another reason for the higher index was a project on U.S. 40 (I-80) in the Sierra Nevada Mountains, where difficult construction conditions tend to

### PRICE INDEX CONSTRUCTION COSTS

1940 = 100



increase costs, which was bid at higher-than-average prices for roadway excavation and concrete structures.

The accompanying graph shows a comparison between the California Index, the Bureau of Public Roads Index and the Engineering News-Record Construction Cost Index. The base and the weighting structure of the BPR Index recently have been changed. The index is shown on the composite-mile basis for the years 1940 through 1961 and converted to the new basis from the first quarter of 1962. The latter two indexes are based on nationwide construction costs and do not reflect the pronounced rises and falls to be found in an index where local conditions are a controlling factor, as in the California Index.

### Federal Aid

A total of \$286,631,017 in federal-aid funds was apportioned to Califor-

nia for 1962-63 under the Federal-aid Highway Acts of 1958 and 1960. This included \$22,247,521 for primary highways, \$10,532,114 for secondary routes, \$25,004,182 for urban routes, and \$228,847,200 for interstate highways. The federal matching ratio on primary, secondary, and urban projects is 59.52 percent. On interstate projects the federal ratio is 91.59 percent.

At the start of the fiscal year, construction was in progress on 99 contracts with a total cost of approximately \$459,910,000, some \$360,710,000 of this amount financed from federal-aid primary, urban, and interstate funds.

Seventy construction contracts involving \$13,182,000 of primary funds, \$9,475,000 of urban funds, and \$138,502,000 of interstate funds, were completed during 1961-62. These amounts, together with the required state

**CONTRACT VALUE RANGE**

	<i>Number of projects</i>	<i>Percent of total</i>	<i>Value of projects</i>	<i>Percent of total</i>
Under \$50,000.....	236	43.5	\$4,943,900	1.6
\$50,000 to \$100,000.....	70	12.9	5,079,500	1.7
100,000 to 250,000.....	98	18.0	16,802,800	5.5
250,000 to 500,000.....	46	8.5	16,394,400	5.4
500,000 to 1,000,000.....	27	5.0	18,638,700	6.1
1,000,000 to 2,500,000.....	28	5.1	43,880,500	14.3
2,500,000 to 5,000,000.....	22	4.1	85,455,200	27.9
Over \$5,000,000.....	16	2.9	114,662,100	37.5
	<hr/> 543	<hr/> 100.0	<hr/> \$305,857,100	<hr/> 100.0

matching funds, bring the combined total cost of such improvements during the year to approximately \$199,-186,000.

Seventy-six contracts totaling \$223,-525,000 were awarded, of which \$171,630,000 were primary, urban and interstate federal-aid funds. Fifty-seven of these contracts provide for improvements on the national system of interstate highways and cost \$146,-342,000. The federal share amounts to \$130,105,000.

Right-of-way project agreements with the Bureau of Public Roads increased interstate federal-aid funds obligated for participation in right-of-way acquisition costs by \$59,490,000, making a new total of \$357,811,000.

**Industry Contract**

The Industry Contract Section obtains prevailing wage contract data from contractor and labor organiza-

tions; collects information for the establishment of equipment rental rates for use on force account work; represents the Division of Highways at hearings of the California Public Utilities Commission on dump truck rental and asphalt hauling rates; and processes minor contracts, right-of-way clearance contracts, informal bid and emergency contracts, and service contracts.

**Service Contracts**

Nearly 5,000 service contracts were processed involving a total expenditure of \$7,000,000.

This type of contract is used for renting equipment and obtaining a wide variety of services. Its use is confined to work not covered by the State Contract Act and not adaptable to minor contracts, right - of - way clearance contracts and other prescribed procedures.

The principal use of service contracts, involving an expenditure of nearly \$2,100,000, was for the rental of equipment for highway maintenance, for highway construction by honor camps, and for occasional day-labor highway construction projects.

**Minor Contracts**

Small projects not exceeding \$5,000 are handled by the districts. A total of 290 minor contracts valued at \$517,000 was awarded during the fiscal year. The average amount per contract was approximately \$1,780.

**Standard Agreements**

Certain types of personal services are obtained under standard agreement. During the fiscal year 90 standard agreements were processed covering such services as appraisers and expert witnesses in right-of-way matters, and professional consultants in unusual design and economic investigations.

**Right-of-way Clearance Contracts**

As in past years, contracts were awarded to clear rights-of-way in advance of construction. Some 897 contracts totaling \$2,400,000 were awarded for the demolition of buildings; 50 contracts totaling \$292,500 were awarded for altering and moving buildings, relocating irrigation systems and fences, and drilling wells.

**COUNTY AND CO-OPERATIVE PROJECTS**

The Federal Secondary Roads Section handles liaison between the U.S. Bureau of Public Roads and the counties concerning all Federal-aid Secondary projects. This unit also performs administrative and engineering functions concerning county and city construction projects on urban extensions of the FAS system, and flood damage repair projects on the local road and street systems. It also keeps county road mileage records used by the State Controller to apportion funds to the counties from the Highway Users Tax Fund. All of these functions are performed with the assistance and cooperation of the City and County Projects Sections in the districts and the Bridge Department.

Administrative and engineering functions performed by the Headquarters Office unit under direction of the engineer of federal secondary roads were combined with those of the city and co-operative projects section on July 2, 1962. The principal staff position in the combined operation carries the title of city and county projects engineer. Henceforth the report for these two units will be combined under the heading of city and county projects.

**The FAS Program**

The Federal-aid Highway Act of 1944 initiated a continuing program of construction on a nationwide system of principal secondary and feeder

roads. As of June 30, 1962, there were 12,137 miles of federal-aid secondary routes in California, including 8,216 miles on county roads and their urban extensions. During the year, there was a total net increase of 122 miles in the system, 44 miles of which were local roads and city streets.

Fifty-eight county federal-aid secondary contracts were awarded during the same period at a total cost of \$14,643,100. These funds covered construction on 171.8 miles of road and 29 bridges.

Federal funds for secondary highways, authorized for the 1962-63 fiscal year, were apportioned to the State on October 10, 1961. California received \$10,532,114, of which 87½ percent or \$9,215,600 was reapportioned to





*Another example of a new federal-aid secondary project, this one on Limonite Avenue in Riverside County.*

the counties in accordance with law. The Division of Highways retains 11 percent of the total allocation for construction on FAS state highways and 1½ percent for planning purposes.

A total of \$4,215,828 was provided from the State Highway Fund in accordance with Section 2210.5 of the Streets and Highways Code to pay counties' share of the construction projects up to a maximum of \$100,000 per county.

#### **The Urban Extension Program**

A program authorized by the 1959 Legislature (Section 143.3 of the Streets and Highways Code) provides state highway funds on a matching basis for improving urban extensions of the Federal-aid Secondary System that are major city or county arterials integrated with the state freeway network and improvements in the contiguous rural area. Projects are ap-

proved on the basis of anticipated traffic volumes which would qualify the proposed sections for improvement to multilane divided status.

Of the first five projects approved for allocations from the 1960-61 budget, four have been successfully completed. The fifth is nearing completion.

All 10 projects approved for the 1961-62 fiscal year were placed under contract before the end of that year. Three of them have been completed. The total cost of these 10 projects is approximately \$3,000,000. State highway funds totaling \$1,466,900 have been obligated toward their accomplishment.

Allocations totaling \$1,414,500 were made by the Highway Commission for fiscal year 1962-63 to pay one-half the cost of an additional five projects. Applications for allocations totaling \$1,045,500 are on hand for eight other

projects to be financed from the 1963-64 budget.

#### **Flood Damage Repair Program**

Except for two projects still to be completed under the Flood Relief Law of 1956, there has been total completion of the flood damage repair program financed under the Budget Act of 1958. Good progress has been made in repairing the 1960 storm damage to local roads and streets under the initial program financed under the permanent Emergency Flood Relief Law enacted by the 1959 Legislature. At the end of the fiscal year, there was only one project not yet ready for contract.

During November of 1961, the northern three counties on the west coast of California suffered intense storms which caused flooding and damage to roads and bridges. In February of 1962, Los Angeles and Ven-

tura Counties were hard hit by heavy rains which caused flooding and brought down mud and debris from burned-off hills upon residential communities in the foothill canyons. Much of the latter damage was quickly repaired and through a "state of disaster" proclamation by the Governor, federal aid was made available under Public Law 875. State funds to activate the Emergency Flood Relief Law were made available by the Legislature under item 13.6 of the Budget Act of 1962.

By the end of the fiscal year, the three northern counties and one city in the south had applied for state aid with qualifying damage totaling over \$1,300,000. In accordance with the statutes, employees of the division investigated the damage and filed reports for transmittal to the Department of Finance. Through an agreement with the California Disaster Office, Division of Highways engineers also investigated and filed reports on 24 local agency applications

for Public Law 875 funds to repair road and street damage.

**County-maintained Roads**

The total county-maintained road mileage on June 30, 1962, stood at 70,027.69. The annual certification issued to the State Controller in accordance with Section 2121 of the Streets and Highways Code showed a net increase of 189.20 miles.

County primary road system changes approved by the department resulted in a net increase of 286.33 miles, bringing the total to 24,594.70.

**CITY AND CO-OPERATIVE PROJECTS**

The primary function of the city and co-operative projects engineer is the administration of the gasoline tax funds allocated for use on city streets.

The Streets and Highways Code provides that 3/8-cent tax per gallon shall be allocated annually by the California Highway Commission from the State Highway Fund for expenditures on city streets, on the basis of each city's percentage of the total population of all cities in the state.

The code also provides for the annual allocation of amounts ranging from \$1,000 to \$20,000 to each city for engineering costs and administrative expenses in respect to city streets. A modification of the code made in 1961 allows cities of less than 10,000 population to use some of these funds for construction.

**New Manual**

A new manual, *City and Cooperative Projects Manual of Instruction*, was developed early in the year, and distributed to the cities and others involved in city gas tax allocations. This manual sets forth policies and procedures for budgeting and expenditure of the gas tax funds allocated to the cities.

Use of the manual along with simplified forms and methods recently put into effect has brought a better understanding between the cities and the division and reduced the time required to process city projects.

**Funds Budgeted**

A total of \$41,621,270 was budgeted for city projects during the fiscal year; including \$25,193,707 for sur-

veys, plans and construction; \$6,063,530 for rights of way; and \$10,364,033 for maintenance. (See accompanying tabulation).

Funds allocated for engineering and administration amounted to \$1,197,033.

**Major City Street Systems**

Each city council is required by law to select a system of major city streets subject to approval of the Department of Public Works. Three-fifths of the state-allocated (3/8-cent) funds are spent for the construction of streets included in these systems.

Master plans being developed by many cities and counties provide a good basis for the selection of these major streets by city councils. During this past year, many cities updated their major city street systems.

Two-fifths of the state-allocated (3/8-cent) funds may be expended for maintenance or for construction.

During the year, 501 sets of plans, specifications and estimates were reviewed and approved for construction. These plans provided for the improvement of 170 miles of streets at an estimated cost of \$24,431,553.

**Population Figures, New Cities**

Populations of cities, upon which apportionment of state-allocated funds are based, are determined by the U.S. census or special census figures; these are modified periodically by estimates of the State Department of Finance, annexations and incorporations.

The total estimated population of the 377 incorporated cities at the end

of the fiscal year was 11,978,475, or approximately 70 percent of the estimated 17,094,000 total state population.

The population in cities increased 534,670 during the fiscal year. This is 5 percent over the June 30, 1961, estimate.

There were 1,131 city annexations during the fiscal year. Five new cities were formed by incorporations. The new cities, with dates of incorporation and estimated population, are: Bell Gardens, Los Angeles County, August 1, 1961, 27,650; Hidden Hills, Los Angeles County, October 19, 1961, 1,653; Pleasant Hill, Contra Costa County, November 14, 1961, 26,328; Brisbane, San Mateo County, November 27, 1961, 4,476; and Villa Park, Orange County, January 11, 1962, 1,368.

**Funds Available to Cities**

State-allocated (3/8 cent) funds available to cities for budgeting during this fiscal year:

Unbudgeted funds in city treasuries and in the State Highway Fund, June 30, 1961.....	\$9,694,337.02
Apportionments during the fiscal year.....	34,948,775.92
Savings on completed projects and canceled projects and interest and rental receipt accruals.....	7,905,810.29
<hr/>	
Total available for budgeting during the fiscal year.....	\$52,548,923.23
Actual amount budgeted .....	41,621,270.94
<hr/>	
Carryover for budgeting in the 1962-63 fiscal year.....	\$10,927,652.29



## SERVICE AND SUPPLY

The Service and Supply Department performs many necessary functions of the division not directly connected with the design construction and maintenance of highways.

### Service

**Reproduction.** Through the use of new procedures this section continued to provide increased reproduction services at a low cost. The Duplicating Unit ran 80,827 masters for a record total of 15,388,172 impressions. This is a 14 percent increase over last year.

**Photography.** An increase of 43 percent (1,684 compared to 1,175) in orders processed was made possible by new techniques. The need for aerial and color photos has increased greatly.

**Records Management.** The Sacramento Record Center now has 18,386 cubic feet of records in storage, an increase of 12 percent over last year. There were 18,366 references made to these records during the year. This service will be initiated in our South Warehouse during the next year.

**Business and Building Services, Property and Building Management.** These comprehensive services made possible the orderly "housekeeping" of Headquarters. This section has been active in expediting the move into the new annex.

**Salvage.** Another service rendered in co-operation with the supply function is the recovery and utilization of salvage and excess materials from construction and maintenance operations.

### Supply

Total purchases processed by Service and Supply for the Division of Highways totaled over \$15.4 million, including warehouse shipments.

Typical of the size of the supply operation was the procurement of nearly four million survey stakes, lath, hubs and ginnies for the field forces. Another item that is being used in greater and greater amounts is glass spheres (beads) used in paint to give it reflective qualities. The order this year was increased to almost one million pounds.



Freeway signs are loaded on a truck at the Los Angeles warehouse.

More than 12,000 requisitions to the Purchasing Division of the Department of Finance were processed.

Warehouse distribution operations continued to increase even though inventories were reduced. When possible the warehouses are bypassed by having shipments sent direct from suppliers to the point of use. This saves unnecessary handling and warehousing. Total purchases were \$5.67 million (up 8.1 percent from last year). Total disbursements were \$5.73 million (up 15.2 percent). Total inventories were \$2.30 million (down 2.4 percent). The ratio of disbursements to inventories was 2.5 to 1, which is the most favorable ever experienced. A total of 34,539 requisitions covering 117,369 items were filled. The distribution of these materials entailed making 13,410 shipments.

Many U.S. government surplus items were obtained at a considerable saving over normal acquisition methods.

The sign program has been expanding rapidly, with the warehouses handling 66,361 signs in the past year.

The budget for nonrental equipment was \$1,200,000. Through cooperation by the districts and other departments, expenditures were held to about \$1,077,000. The nonrental inventory as of June 30, 1962, was \$14.9 million, up 7.3 percent from the previous year.

Orders to the State Printing Plant are being combined and standardized for efficient handling. As a result, the number of printing orders has not increased over last year in spite of an increase in quantity of material ordered. Printing costs can be lowered by a judicious grouping of items.

The catalog of warehouse items is being constantly revised. A new method of preparing catalog copy is being used which will result in faster listing of new items.

Service and Supply Headquarters Office has assumed the responsibility for the payment of all freight bills, to promote efficiency in the processing of these documents.

## MANAGEMENT ANALYSIS

The purpose of this section is to make studies and recommendations and provide advisory services on administrative and management problems throughout the division, and to assist in carrying on a divisionwide records management program.

Several major steps were taken toward improving procurement and warehousing operations by reducing current inventories and maintaining future inventories at minimum levels consistent with need, resulting from a specific study in this area.

As the result of another study, improvements were made in the method

of submitting division needs for non-rental equipment. This has facilitated the review and modification of needs. A further improvement in the revised nonrental equipment system was developed and tried on a pilot basis.

Two comprehensive record usage studies were made for two districts. The recommendations are being implemented and are resulting in: reduced cost of filing operation; elimination of duplicate records; elimination of obsolete material; reduction in purchase of new filing equipment; saving of office space; and a uniform filing procedure. Reduction of prime office

space for District VII will result from changing the southern record warehouse to a file record center operation.

The field review of filing needs resulted in a dollar savings of more than \$19,500 for the 1962-63 fiscal year. Previous usage studies and periodic consultation with recordholders caused movement of 5,900 cubic feet to record centers and destruction of 5,600 cubic feet during 1961.

Assistance given in the design of forms resulted in four division memorandum forms being eliminated.

## SYSTEMS RESEARCH

The first full year of operation of the systems research engineer has been mainly devoted to the study and analysis of problems in the fields of engineering costs and productivity. Staff support has been provided by the Management Analysis Section and the Project Control Unit of the Office Engineers Department.

A statewide study of engineering costs was made, especially in those areas of engineering methods and activities which were most significant in developing good performance ratios and those which produced poor performance ratios. Considerable effort was directed at developing a greater sense of cost consciousness in the attitudes of the personnel engaged in engineering activities, as well as those in nonengineering or "support" positions.

A second major study was initiated to develop productivity indices, based on the actual accomplishments

of the districts and the Bridge Department during the period July 1, 1955, through June 30, 1961, which could be applied to planning program schedules to project overall staffing needs and corollary requirements through 1970-71. Further refinements of the indices are being studied which will eventually result in a workable staffing guide for use by all offices of the division to determine future needs.

This study, which is still underway, has already provided management with a useful tool in forecasting personnel requirements in relationship to program goals. When the basic procedures have been perfected and programed for electronic data processing the division should be able to forecast and anticipate adjustments in its working force in each district resulting from changes in program emphasis or size.

Close co-ordination has been maintained with the Accounting Depart-

ment in converting the Division of Highways accounting to electronic data processing for cost analysis purposes. In order to make the accounting information more helpful to management throughout the division, activity codes were more accurately defined, additional needed codes determined and unnecessary ones discarded. With the installation of the latest in electronic data processing equipment, it is expected that detailed cost information resulting from the conversion will be available within the next (1962-63) fiscal year and should furnish valuable data to management to further aid in the establishment of productivity standards and control of engineering costs.

The systems research engineer also headed staff liaison for the budget review committee of the division in the preparation and review of the operating budget for the Headquarters units for the current fiscal year period.



# • Planning

- *The Assistant State Highway Engineer, Planning, is in charge of advance planning, programs and budgets, design, traffic, and highway planning survey*

## ADVANCE PLANNING

The advance planning engineer is in charge of the Advance Planning and the Photogrammetric Units.

The Advance Planning Section is responsible for processing project reports, co-ordinating route adoptions and freeway declaration procedures, processing freeway agreements, and co-ordinating the Division of Highways planning work with that of other state, federal, or local agencies.

### Project Reports

A project report covers the engineering investigation and analysis of a specific project. This report sets forth need and type of the planned highway improvement and how it should be accomplished.

Project reports are required for all proposed improvements. They constitute a control mechanism in planning and budgeting, and provide information for basic design features. They are prepared in the districts.

The reports are reviewed at the Sacramento headquarters where analysis by other departments is co-ordinated by the Advance Planning Section after field review. This analysis insures an orderly development of surveys and plans.

Aerial mapping is being used more and more to evaluate topographic controls and expedite the preparation of project reports.

Project reports for 281 proposed projects were processed during the year, 177 of which were major projects.

### Freeway Routes

The development of an integrated system of freeways, one of the most important phases of modern highway planning, has been emphasized in Cali-

fornia for many years. It involves consideration of community values and potential land uses, as well as traffic needs and benefits.

The Division of Highways informs all local authorities of the initiation of freeway route studies and of the general features of proposed freeway units as the studies progress. When sufficient information has been developed on a specific freeway project, a well-publicized public hearing is held in the general area to present the results of the study to local officials and the interested public and to learn the local reaction to the project plus any

information which may be pertinent to the routing. The current commission procedural policy, which is contained in Subchapter 4 of the California Administrative Code under which the Division of Highways operates in freeway route location matters, is included in the statistical supplement of the Annual Report.

Transcripts of proceedings of public hearings, together with reports on the results of conferences are made available to the Highway Commission for consideration in the determination of freeway routings.

During the 1961-62 fiscal year, the district staffs of the Division of Highways held 58 of these formal public hearings to discuss proposed freeway routings. A number of conferences with city and county officials and their technical staffs were also held, as were several hundred preliminary informational meetings and map displays. The California Highway Commission itself also held 11 public hear-

*Construction is continuing on U.S. 101 freeway through the San Diego Metropolitan area. This view shows the freeway route looking southward toward National City from the San Diego downtown business district. San Diego Bay at right.*





ings during the year, 7 at the request of the local authorities and 4 on its own initiative. The public hearings held by both the Highway Commission and the Division of Highways are listed in the statistical portion of the Annual Report.

The California Highway Commission had under consideration during the year some 76 freeway projects and adopted routings on 65 of them. These adoptions increased the freeway mileage 594 miles, making a new statewide total of 6,203 miles of declared freeway as of June 30, 1962.

#### Freeway Agreements

Close co-operation between the State and cities and counties resulted in working out and concluding 207 freeway agreements during the year. In some cases, original agreements were replaced by supplemental agreements which incorporated improved design standards or provided for changes in traffic patterns or local planning.

#### Interstate Highway System

Advance planning is also responsible for obtaining the approval of the U.S. Bureau of Public Roads on the final locations of all routes on the interstate highway system. This is done for each interstate section after adoption by the California Highway Commission. At the end of the year, the locations for approximately 1,936 miles, about 89 percent of the interstate system in California, had been approved. Another 170 miles were being processed for submission to the bureau. The



Surcharge fill is being placed across coastal lagoons north of San Diego for the future relocation of U.S. 101 (Interstate 5). This view is southward across Batiquitos Lagoon, toward Leucadia and Encinitas.

total mileage approved or under consideration at the end of the fiscal year is, therefore, about 96 percent of the total authorized interstate system in the State.

#### National Forest Highways

The Division of Highways acts jointly with the U.S. Bureau of Public Roads and the U.S. Forest Service in an annual improvement program on California roads designated as forest highway routes. The forest highway network in California covers approximately 2,537 miles, about 75 percent of which is on State highway routes.

The California apportionment of forest highway funds for the 1961-62

fiscal year was \$4,726,004. Including funds remaining from previous apportionments, the distribution of forest highway money in the State as agreed upon by the three agencies were as follows: projects on state highways, \$5,360,000; projects on county roads, \$200,000; system surveys, \$250,000.

The Bureau of Public Roads plans, designs, advertises and supervises the construction of federally financed forest highway projects. For projects on state highways, the Division of Highways works with the bureau in the planning and design phases and also obtains the required rights-of-way, including clearance of utilities and options on material sites.

## PHOTOGRAMMETRIC MAPPING AND AERIAL PHOTOGRAPHY

Aerial photography has become an important aid in advanced planning, design, right-of-way, and traffic studies, and is also used to some extent in other facets of the highway program. The need for up-to-date aerial photography and associated reproductions now constitutes about 24 percent of all photogrammetric costs, compared to 15 percent reported in previous years.

Photogrammetric mapping, which makes up the other 79 percent of all photogrammetric costs, is frequently used during the advanced planning phase on the study of possible alter-

nate routes, and the location and design of adopted routes. Most of this work was done by contract, although a portion of it was performed by the photogrammetry unit.

The accompanying table is a resume of expenditures for contracts completed during the fiscal year.

#### Developments

Photogrammetric cross sections have been taken on some construction projects for the computation of earthwork excavation quantities. The cross-section data are automatically recorded on punch cards by means of an elec-

		Highway	
	Contracts	strip	Contract
		miles	amount
Contour mapping projects for design	40	319	\$392,894
Contour mapping projects for reconnaissance	5	57	33,231
Stereoplotter rental contracts	13	-	60,387
(Compilation for design)	-	106	-
(Compilation for reconnaissance)	-	63	-
Aerial photography contracts	18	-	50,540
Aerial photography contracts (blanket)	10	-	105,043
Total			\$642,095



tronic attachment to a stereoscopic plotting instrument. The procedure has been used to advantage on several types of construction problems.

For example, a large slide occurring during construction of one project ultimately required a major design and construction change. Immediately after the slide, aerial photography was taken to obtain a record of the ground for photogrammetric cross-sectioning. As the reconstruction progressed, more photographic missions were flown for cross sections which were used as a basis for computation of progress pay quantities.

In another instance, a material site was located in gold dredger tailings. Aerial photography was taken for photogrammetric cross sections of the undisturbed ground. This particular site was characterized by successive rows of rock ridges about 20 feet high, making it very difficult to cross-section by field methods. Upon removal of the material, a second flight is planned for cross sections for computation of total excavation for final payment.

A third instance involved a major construction project in timbered, mountainous terrain. The right-of-way had been cleared under a separate contract one year in advance of construction. Because of adverse

weather conditions field surveys were delayed up to the time of the construction contract. In order to allow construction to proceed on schedule an aerial photographic record of the undisturbed ground was taken for the cross sections. The excavation quantities developed from the cross sections will be used for final payment.

Precision aerial photography of the terrain prior to construction provides a permanent record which can be referred to any time after construction has commenced. For this purpose it is necessary to premark or target the staked centerline, or its equivalent, before the photography is taken to insure positive identification of the line.

#### Map Checking

About two-thirds of the total mapping mileage obtained by photogrammetric contract is reviewed photogrammetrically. This is an established service which provides advanced information to the districts as a guide for performing accuracy surveys by field methods.

#### Geodetic Distance Measurement

The photogrammetric unit continued to operate the geodimeter party as a service to districts requiring precise surveys. The following tabulation is a resume of the operations by this party:



A mileage marker for aerial surveillance is painted on U.S. 40 near Davis.

Observing nights .....	126
Number of observations .....	1,293
Number of setups .....	576
Average number of observations per setup .....	2.2
Average number of observations per night .....	10.3
Total miles observed .....	643.0
Average distance observed (miles) .....	0.5

Because of the demand for geodimeter surveys, several districts were encouraged to obtain their own equipment. The division now has a total of eight Model 4 geodimeters, seven of which are located in district offices and one in headquarters.

## PROGRAMS AND BUDGETS

The Programs and Budgets Section makes projections on the availability of funds for highway purposes, establishes target figures to be used in planning, develops the statewide long-range planning program in co-operation with Planning Survey, prepares budget recommendations for consideration by the California Highway Commission, maintains a constant check on the funds available for highway purposes in a fiscal year budget, recommends action on unbudgeted or minor improvement projects, and administers the annual buildings and plants program.

#### Budget and Revenue

Division of Highways funds are derived from state and federal sources. State sources, which comprise the major portion, are the gasoline tax,

the use fuel tax, motor vehicle fees, and the transportation tax. Federal apportionments for right-of-way acquisition and construction on federal-aid projects during the fiscal year amounted to approximately \$274,000,000, or about 42 percent of the total revenue.

The division's revenues closely accord with the volume and type of highway traffic. Traffic records throughout the State are used as a guide in estimating probable revenues for planning purposes. For budgeting, estimates of probable revenues are determined after consultation with other agencies with functions related to state highway income, particularly the Departments of Finance and Motor Vehicles, and the Board of Equalization.

#### Planning Program

Planning programs for the eight-year period from July 1, 1963, through June 30, 1971, were developed for the 11 state highway districts.

Each district prepared and submitted a program for the period. These programs were reviewed by all Headquarters departments and modified to provide uniformity and continuity on a statewide basis.

The planning programs as modified and adjusted were presented to the California Highway Commission for their review.

These planning programs are the first under the new allocation and expenditure provisions of the statutes enacted at the 1961 session of the Legislature.

#### Expediting and Co-ordinating

Continuation of the expediting and co-ordinating function has resulted in a close liaison between the districts and Headquarters departments. Frequent review of the status of the various proposed construction projects helps to eliminate delays in completion of plans, right-of-way acquisition and utility relocations.

Statistical records are being maintained to show the complete status of each highway construction project from initial planning studies to the call for bids.

#### Buildings and Plants

During the fiscal year, the addition to the headquarters annex building was completed. Construction of an annex building at the district office in San Francisco was begun. Maintenance stations at Willow Creek, Weitchpec, Hot Creek, Alemany, Mendota, Barstow, Dry Creek, Riverside, Sonora

Junction, Long Barn, Coulterville and Groveland were constructed or enlarged.

Plans were being developed for maintenance stations at Forest Glen,

Elk Grove, Nevada City, Kyburz, Petaluma, Wrightwood, Dawson Saddle, District VII Laboratory, Death Valley Junction, McGee Creek and San Diego.



Each year the California State Chamber of Commerce sponsors "grass roots meetings" on highway planning. At the Salinas session, shown here, A. H. Clark of Soledad, Central Coast Chairman for the State Chamber Highway Committee, is displaying a highway planning map as Programs and Budgets Engineer E. J. L. Peterson (standing, left) explains Division of Highways financial projections.

## DESIGN

The work of the Design Department includes geometric design; structural design of the roadbed; contract plan review; research and special studies; drainage and co-operative agreements; and erosion control and roadside development.

#### Geometric Design

The Geometric Design Unit processed 580 interchange and intersection designs during the year, including 16 designs for bus stops, weigh stations and safety rest areas. The exhibit maps for 207 freeway agreements were re-

viewed and a total of 45 reports involving requests for new connections or separations on freeways were processed for presentation to the California Highway Commission. A total of 577 bridge designs were reviewed with respect to geometric design features.

#### Structural Design of the Roadbed

All proposed projects are reviewed with the primary objective of providing for the structural requirements of the roadway and insuring the most effective and economical use of materials. Reviews are performed at various stages of project design and include the structural typical sections, 185 of which were submitted during the fiscal year; materials reports; preliminary reports; special provisions and contract changes. Justification of the pavement type selected for each major project is documented.

Close liaison is maintained with the districts and other headquarters departments regarding design details for specific conditions such as foundation and slope stabilization, embankment protection, subdrainage, materials sources and specifications.



Looking east along the newly opened Ventura Freeway extension from above the interchange with the Hollywood Freeway in North Hollywood.



Periodic observations are made of the service performance of pavements and related design features in order to obtain factual data upon which standards and policies may be based. Among the current studies is a statewide survey of rigid pavements similar to a previous survey of flexible pavements which resulted in improved specifications and design procedures.

#### **Contract Plan Review**

In the 1961-62 fiscal year, 390 projects were processed in comparison to 412 in the previous fiscal year. Approximately 6,600 sheets of contract plans were reviewed in preparing these projects for advertising; this is 700 sheets less during the preceding year.

While the total number of projects shows a small decrease, the average project size and complexity have increased considerably. The decrease in the number of contract plan sheets is due in part to the fact that federal-aid secondary projects are no longer processed in the Design Department; they are now handled entirely by the City and County Projects Section. More significant is the decrease in the total number of sheets required for comparable projects due to improvement in plan preparation methods.

#### **Research and Special Studies**

Several studies relating to freeway design are presently under way in co-operation with the districts and other departments.

An investigation is being made of the use of models to help determine the design of complicated interchanges so that they will offer the most satisfactory operating conditions.

The costs of various median widths are being analyzed to determine the possible need for a greater basic width.

Several types of branch connection designs at freeway-to-freeway interchanges are being developed to determine the best type for specified design and traffic conditions.

An investigation has been completed as to the proper warrants for location of ramp terminals at crossroads, particularly in relation to sight distance at overcrossing structures.



Former site of the Sand Hills Maintenance Station in Imperial County, now used as a safety rest area on U.S. 80 (Interstate 8).

#### **Drainage and Co-operative Agreements**

The great increase of freeway construction in urban areas has added to the complexity of drainage problems. Urbanization of an area often requires changes in drainage outside the limits of the freeway and beyond the normal scope of highway drainage work. In some cases comprehensive drainage improvements have been accomplished through co-operation of state and local agencies. In several instances, marked drainage improvements for the community have been made in conjunction with the construction of freeways. The use of highway funds in such drainage improvements is limited to the cost of perpetuating existing conditions and protecting the highway from flooding or damage.

Co-operative projects for local street rearrangements and betterment agreements have increased. Co-operative agreements also have been used more frequently for the excavation of needed freeway material from planned public works such as channel improve-

ments. This type of agreement usually results in savings to both the State and the public agency concerned.

During the fiscal year, severe storms in portions of Southern California provided a good test of the freeway drainage design and showed that the highway drainage systems handled the most severe storms with minor ponding on the freeway. Only a few isolated ramps were closed because of the local street flooding.

#### **Erosion Control and Roadside Development**

Since it is a highly specialized activity, the roadside development unit has in the past prepared all plans for functional planting and landscaping projects in Sacramento for the districts. During the 1961-62 fiscal year, plans and specifications for 33 budgeted projects were completed.

A study is being made to determine the advisability of creating landscape sections in the San Francisco and Los Angeles metropolitan areas.

Certain items necessary for erosion control and landscape preparation can more economically be handled under major construction contracts. All typical cross sections for all projects are reviewed with this in mind. The landscaping preparation includes such items as contour grading, deep cultivation, spreading topsoil and installing waterlines or encasements for future waterlines under roadways.

During the fiscal year, 33 functional planting and landscape projects valued at \$3,475,000 were financed. The following list of quantities involved in these projects will give an idea of the

amount of work entailed in the design preparation: 4,185 tons of straw, 149,690 pounds of seed, 626 tons of commercial fertilizer, 374,850 assorted trees and shrubs, and 4,199,940 ground cover plants and cuttings.

Most of the trees and shrubs are furnished by the contractors from commercial sources. A major portion of the state-furnished trees and shrubs also are purchased by the State from commercial nurseries. In many cases a contract to propagate and grow such plants is entered into between the State and a commercial grower. When the plants have reached the proper

size they are delivered to the State nursery at Davis or the holding yard in Los Angeles where they are picked up by the contractor.

Some varieties not generally grown by commercial nurseries have proved adaptable for roadside use and are propagated at the State Nursery. Also many freeway planting projects require larger quantities of certain plants than the commercial nurseries can afford to handle without definite orders and delivery dates. These, along with plants for experimental purposes also can be better furnished by the State.

## TRAFFIC

In 1961 motorists traveled approximately 35 billion vehicle-miles over all state highways in California, about 47 percent of the total travel in the State. Nearly half of the travel on the state highway system was in cities. 1961 statewide travel showed an increase of 4.4 percent over 1960.

Under the new traffic-counting system, which was described in the last annual report, 40 full-time employees can determine traffic volumes with new automatic and self recording equipment. Under the old manual system of counting, some 390 temporary employees were needed each month, except in July when 6,200 temporary employees were required to take the annual summer count. The cost of conducting the traffic census has been reduced from an average of \$642,000 in previous years to \$422,000 for the 1961-62 fiscal year. The current cost is based on \$395,000 for salaries plus 10 percent depreciation per year on the \$270,000 cost of the new equipment. The annual savings is therefore \$220,000.

A new format has been adopted for the *Annual Traffic Census* booklet. The former raw count data (16-hour Sunday and Monday July counts) were replaced with annual average daily traffic and peak seasonal ADT columns. The new booklet uses a county-route-postmile system for identifying count locations and an improved list of intersection and landmark names to make the information



E. J. McCall, Service Manager of the Southern Division of the National Automobile Club, plays the part of a motorist in distress to illustrate the use of one of the 80 emergency call boxes which have been installed on Los Angeles freeways.

more meaningful. A detailed average daily traffic profile can now be plotted directly from the booklet.

The total accident rate per million vehicle-miles and fatality rate per 100 million vehicle-miles on the rural state highway system was 2.38 and 8.62 respectively, for 1961. The comparable rates for the combined rural and urban freeways was 1.28 and 2.89, respectively.

In January 1962, a highway safety research unit was established in the Headquarters Traffic Department to devote full-time research to highway safety. Among the projects currently under study are:

1. Evaluation of minor improvements and development of criteria for their use.
2. Wrong-way driving on freeways and their connections.
3. A comparison of freeway sections to determine reasons for dissimilar safety records.
4. A two-year median barrier evaluation.
5. Relation of ramp type to accident rates.

### Geometric Standards and Traffic Service

Research continued on several phases of freeway operations to develop relationships between traffic op-



eration and geometric design. Studies completed or in progress include operational effects of weaving and merging traffic and effects of slow moving vehicles. A study entitled "Traffic Behavior and Off-ramp Design," made in co-operation with the U.S. Bureau of Public Roads, was also completed.

A unique study was undertaken on freeways in the Los Angeles area to obtain information on trip characteristics. This study involved the photographing of vehicle license plates with motion-picture cameras at several locations on the freeway system, looking up the addresses of the vehicle owners from Department of Motor Vehicles records, and then mailing out a questionnaire to each owner in order to obtain information about his trip. A followup questionnaire will be mailed to the same motorists later in the year, to determine if they travel on different routes as a result of completion of several new freeway projects during the year.

#### Traffic Signals and Illumination

Contract plans were completed for 153 new traffic signals and modernization of 169 existing signals. Contract plans were also completed for 3,721 lighting standards and 393 illuminated traffic guide signs. The total estimated cost of the electrical work was \$7,218,255 not including the cost of steel sign structures.

A total of 217 traffic reports reviewing conditions at approximately 522 intersections were made to determine the need for traffic signals or lighting.

Research projects underway or completed include the following:

1. Continuation of research by a private firm to develop a nuclear-energized self-luminous highway directional sign.
2. Complete development of a new vandalproof fluorescent lighting fixture for use in pedestrian undercrossings.
3. Began research to develop a method of providing lights in the pavement for illuminating the underside of trucks at truck weight station inspection areas.
4. In co-operation with the Highway Patrol, conducted tests at truck weigh stations to improve visibility for operators inspecting truck-trailer couplings while vehicle is being weighed.
5. Concluded tests on an electroluminescent highway directional sign.



Restrictive pavement markings are painted at the ends of freeway offramps to prevent wrong-way entrances.

Plans and specifications were completed and installation begun on an experimental emergency call box system on 10 miles of freeway in the City of Los Angeles. The system consists of 80 solar-powered battery operated radio transmitter type call boxes spaced  $\frac{1}{4}$  mile apart to the right of each roadway. A motorist in distress can summon a police officer by pushing a button on the box. The responding officer can open a locked compartment on the box and call for any of 14 services as required by the situation. This is believed to be the first installation of this type in the United States.

#### Traffic Regulation and Control

A new edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways* to which all States are required to conform on roads involving federal participation in financing, was published by the U.S. Bureau of Public Roads. To avoid a double standard in the State, the new national standards have been adopted for all state highways. A complete inventory of all existing highway signing has been initiated in order to establish a practical program to bring all highway signing up to present day standards.

All new signs ordered now conform to the new national standards. This required revision of the sign specifica-

tion sheets prepared for sign manufacturers and the publishing of a new edition of the *Planning Manual—Part 8, Traffic*. This revision included all of the revisions required to conform both to the national manual and legislative changes enacted by the 1961 Legislature. The manual was widely distributed to city and county highway and traffic officials in order to promote greater uniformity in the use of traffic control devices throughout the State.

A new edition of the *Manual of Warning Signs, Lights and Devices for Use in Performance of Work Upon Highways* was published and distributed. A new edition of the *Uniform Sign Chart* was also published and distributed; and a new edition of the *School Crossing Protection* pamphlet was published on January 1, 1962, and distributed to school superintendents and other interested officials. All these new manuals were prepared in conformance with the new national standards.

Traffic control measures taken during the year included:

- 238 restricted speed zones were established and 42 existing speed zones were removed, resulting in 82 additional miles of speed restrictions of state highways.
- 66,361 highway signs were approved for installation, comprising 27,890 warning signs, 15,214 regulatory signs, 16,422 guide signs and 6,835 construction and miscellaneous signs.

## HIGHWAY PLANNING SURVEY

The Planning Survey Department is composed of two main operating units, collateral engineering and statistical-financial.

Engineering and economic investigations usually are statewide or affect more than one district. Many such studies are undertaken at the request of the U.S. Bureau of Public Roads. Other studies are authorized by the State Legislature. Most of the studies are financed partly by Federal "Research and Planning" funds which amount to a maximum of 1½ percent of the total annual federal-aid apportionment to California.

Drafting Section prepares maps, plates, and exhibits for headquarters departments, and for studies and reports in connection with all phases of work of the Planning Survey.

An Electronic Data Processing and Machine Methodology Section provides data processing and electronic computer services for Planning Sur-

vey and other departments as well as for the districts and other divisions of the Department of Public Works.

The planning library is also a Planning Survey unit.

### Engineering Studies for the Legislature

Legislative studies underway during the 1961-1962 fiscal year included:

S.C.R. No. 6, 1962, which requests a study of a Humboldt Bay Crossing. Traffic investigations are underway, the Bridge Department has started test borings and is preparing a cost estimate on a proposed alignment. Field reviews of the area by Planning Survey have been made. The report is due prior to the start of the 1963 session.

S.C.R. No. 8, 1962, which requires a study of the renumbering and naming of highways, freeways, and expressways. The Planning Survey and Traffic Departments are jointly responsible for this study.

S.R. No. 26, 1962, which concerns the development of recreational areas along rivers where crossed by bridges. Representatives of the Departments of Public Works and of Parks and Recreation have met and made joint field trips.

S.C.R. No. 4, 1962, which is a further development of S.C.R. No. 39 adopted in 1961, authorizing preparation of a report on recommendations for a statewide system of scenic highways. The report on a preliminary plan for scenic highways was issued on March 15, 1962, by the Department of Public Works as a joint effort of a citizens advisory committee and an interdepartmental co-ordinating committee. As a result, workshop meetings with local interested groups were scheduled in the various highway districts to discuss the proposed scenic highway system. Subsequently, a revised system will be delineated and



Workshop discussions were held throughout the State in 1962 in connection with continuing studies looking toward a system of scenic highways. This one was in San Luis Obispo.



a new report submitted to the Legislature.

S.C.R. No. 20, 1962, which requested preparation of a detailed technical prospectus covering the scope and objectives of a comprehensive transportation study of the nine counties adjoining San Francisco Bay, including such matters as a review of all land use, transportation and economic development studies in the field of transportation. The prospectus was to be completed by November 1, 1962.

In addition to the major studies and reports outlined above, Planning Survey has spent some time on several other studies covering such diverse matters as rest areas along noninterstate highways, naming of specific state routes in honor of persons, emergency call boxes on state highways, and compensation to cities for bus turnouts on freeways.

#### **Studies for Bureau of Public Roads**

Preparation in graphical form of physical and traffic features of all existing traversable routes for the interstate system was completed in September 1961. This is known as the interstate traveled-way study.

A new project, Interstate Accident Study II, is being conducted on selected portions of the interstate system to determine the effects of geometric design features on highway safety. Two portions of Interstate Route 80 have been selected: from Powell Street in Emeryville to north of Redwood Street in Vallejo, urban in character; and a rural section from Roseville to Auburn. Co-operating with the Planning Survey in this work are the California Highway Patrol and the Bureau of Public Roads. Results will be correlated with a nationwide study.

Another major project, which has been submitted to the BPR, concerns additions to and renumbering of the entire federal-aid primary system. Proposed primary additions of more than 600 miles are chargeable against an increment authorized under federal statutes. Strip maps delineate each separate primary route. State maps and enlargements show the proposed renumbering which integrates the additions with the existing system by a minimum of new routes. The proposed

renumbering achieves better continuity and reduces the total number of routes by combining shorter sections. Finally, numbering of primary routes which underlie the interstate system has been clarified and simplified.

A continuing project is the preparation of maps of urban areas to show urban boundaries for the administration of federal-aid funds by the Bureau of Public Roads. Maps have been made for new urban areas disclosed by the 1960 census, and revisions are in process for approximately 30 other areas with outdated maps. Dozens of cities have been combined in three metropolitan area maps: one for the San Francisco-Oakland-San Jose area; another the entire Los Angeles-San Bernardino region; and the third for the San Diego urban area.

#### **Other Engineering Studies**

Field reviews by joint Headquarters-district teams were made of certain traversable roads between the termini of unconstructed state highway routes authorized by the Legislature. Reports were prepared, with descriptions, photographs, route maps, and traffic data.

#### **Statistical Studies**

The development of methodology and also the data processing for the long-term Los Angeles Regional Transportation Study (LARTS) has continued to be a major statistical study for the highway planning survey during the year. The basic analyses of relationships from the survey data have been completed to the extent that trip generation factors for the trip development model have been accepted for a preliminary assignment to the 1960 network. The 1960 network has been completely described in numerical terms and processed on the computer. It is expected that distribution from the model will be completed and assignment of trips from the model, as well as trips developed directly from survey data, will be completed and assigned to the 1960 network by the end of August 1962.

Completed during the year as a basis for the model development and the processing of the trip data were the methodology and computer programs which made it possible and reasonable to deal with the LARTS study

area as a single integrated system. The area contains 9,000 square miles and a present population of about 7 million persons. The number of detailed traffic zones in this study area totals nearly 2,400. To handle a system of this size a sector approach was developed to handle the processing of the shorter trips. The longer trips were processed on a major zone system comprised of nearly 300 zones.

#### **Financial Studies**

Three co-operative studies with the U.S. Bureau of Public Roads were carried on:

The annual local road and street finance report covering transactions of fiscal year 1959-60 was completed.

In the roadlife and pavement cost study, basic data on the 12,000 miles under study were recorded through 1959 and compilation of tables for the Bureau of Public Roads begun.

A post mileage was added to the 1961 status of highways based on the 1960 status mileage.

#### **Data Processing Activities**

During the past year the data processing capabilities of the Division of Highways were augmented by the addition of two 1401 data processing machines and by the conversion of some standard programs to use the full capabilities of the 704 which was purchased in 1961. Processing of a routine nature as well as for special reports and special subjects continued during the year. Accounting data were processed, although development in this area is still continuing.

Rapid transmission of data between one district and Headquarters was begun on an experimental basis, and success in this area is now leading to enlargement of data transmission facilities. The punched card processing load dropped slightly and some tabulating machine operators were retrained as procedure and program developers to use the newer equipment.

General use of the standard engineering services provided by the highway planning survey has increased due to more rapid transmission and to general acceptance by the engineer. Approximately 10,000 traverse courses per day and earthwork quantities of 16,000 cross sections monthly are being calculated by this service.



# • Bridges

- *The Bridge Department is under the administration of the Assistant State Highway Engineer—Bridges and is responsible for the design, construction and maintenance of all bridges and structures on the state highway system*

A branch office of the Bridge Department is located in Los Angeles to maintain liaison with southern area districts, perform planning functions and supervise construction and maintenance of structures within these districts. All other functions, including design work, are handled at headquarters in Sacramento.

## BRIDGE PLANNING

Advance planning work of bridge site investigations, collecting and assembling data and preparing preliminary design reports was more extensive in fiscal year 1961-62 than in any previous year. Engineering design was initiated on 577 structures, 40 more

The department is divided into five sections—Planning, Operations, Special Studies, Office Engineering, and Special Projects. The maintenance and operation of state-owned toll bridges are also under the administration of the Bridge Department.

than the former high in 1956-57 and 9 percent more than in 1960-61.

Close coordination of highway and bridge planning is maintained throughout all phases of project development. Alternative structure types are studied as to feasibility, cost and appearance.

Recently examined as possibilities for portions of several metropolitan freeways were single- and double-deck viaducts; multilevel interchanges;

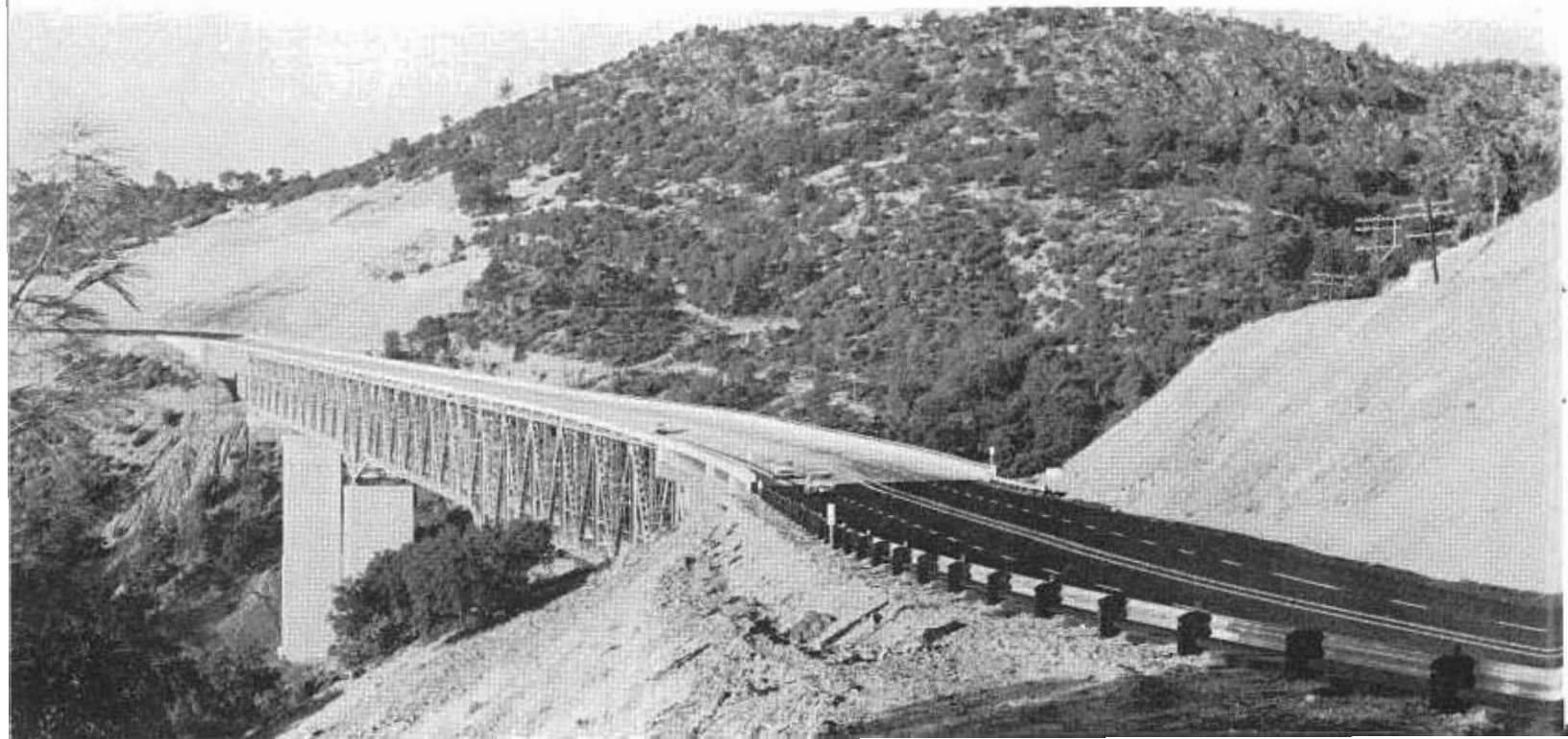
underwater tubes; fixed and movable bridges over navigable waterways; high-level, long-span bridges and a large variety of highway separation structures. In the case of the proposed Route 105 crossing of Upper Crystal Springs Reservoir in San Mateo County, one of the alternative routes may be practically eliminated from consideration because the cost of building bridge piers in deep water through 90' of peat would be excessive. Through the co-operation of the San Francisco Public Utilities Commission foundation explorations were made from a barge in such a manner as to avoid pollution of this very important water supply.

### Architectural Bridge Design

To illustrate the effect on the landscape of a high-level or a low-level route around Emerald Bay several scale models were constructed showing highway cuts and fills, tunnels and snow sheds in detail. These models were displayed at meetings of the Park and Highway Commissions. In addition, a photographic brochure of both the high-level and low-level all year lines was made.

To meet an increasing demand for visual aids during the fiscal year the Bridge Architectural Section made 75 sketches and renderings, 27 photo retouches and 16 models. Noteworthy success was achieved in the combined use of renderings and photo retouches of the Upper Newport Bay crossing.

PHOTO BELOW—The new West Branch Feather River Bridge on U.S. 40 Alternate in Butte County





Models have proven particularly effective, especially in court cases.

#### Foundation Section

The Foundation Section is in the process of acquiring a compact, portable seismic unit which will greatly speed foundation studies in difficult terrain where equipment access is a major problem.

The section is presently involved in a research program on the settlement of approach embankments. Correlations are being made at numerous sites between calculated theoretical settlements and actual settlements of the embankments when in place. The aim of the program is to be able to predict settlements more accurately thus minimizing problems effecting bridge construction and maintenance caused by embankment settlements.

The section is also continuing its pile load test program throughout the State in order to increase the economy of foundations through wider application of pile types and increased loadings.

Forty-three Bridge Department-administered contracts were completed during the year at a total cost of \$56,556,000. Four large contracts on the Santa Monica Freeway Viaduct, the West Branch of the Feather River and the Benicia-Martinez substructure account for \$46,297,000 of the above figure. Approximately \$65,530,000 in structure work was completed on 81 district-administered contracts for an overall total of \$122,086,000 involving 124 contracts and construction of 438 new structures, as well as a number of retaining walls and the widening and repair of existing structures.

At the end of the fiscal year, 182 structure projects were under way with an approximate cost of \$222,303,000. This includes funds for the Benicia-Martinez superstructure, the San Pedro-Terminal Island sub- and superstructure contracts, projects financed from various fiscal year budgets and work on federal-aid secondary projects.

During the past fiscal year, the Foundation Investigation Section completed a total of 697 foundation studies for bridge and freeway structures. In addition, a total of 113 foundation studies for retaining walls was completed.

A total of 110,673 lineal feet of exploratory borings was drilled during the year to determine foundation conditions at the various sites. Foundation studies were completed for many large structures including the proposed Yolo Bypass Section of the West Side Freeway, Crystal Springs Reservoir Crossing, Sacramento River, Colorado River Bridge at Topock, and major interchanges in the Los Angeles area.

#### Design

Among the many structures designed during this fiscal year, one of the most interesting was the substructure of the Sacramento River bridge between W and X Streets. The total cost of this bridge will be approximately \$12,000,000. The total length of bridge is about 5,500 feet, with two main river channel spans of 275 feet.

## BRIDGE OPERATIONS

The 1961-62 state highway budget had \$68,506,000 in structure work in 95 projects. Miscellaneous projects including maintenance, FAS, and work for other agencies \$2,606,000 for a grand total of \$71,112,000. All structures in this budget year are either completed or under contract.

#### Metropolitan Freeway Structures

In Oakland, extending southeast from the Bay Bridge distribution structure, work was completed and traffic began using 18 bridge structures costing over \$7.5 million on the first section of the MacArthur Freeway. Two additional contracts on this route totaling about \$4 million in 25 structures are well along.

Widening of five structures to convert the heavily traveled Nimitz Freeway in Oakland from six to eight lanes is more than half complete.

Bridge work on 14 structures for the freeway extending south from the new Benicia-Martinez Bridge in Contra Costa County is nearing comple-

Another interesting bridge design was the Cold Spring Canyon Bridge, located on the San Marcus Pass Road, about 15 miles north of Santa Barbara.

The 700-foot steel arch span and approach spans make up a total bridge length of 1,218 feet. The two-lane roadway is supported on two arch ribs, each of which is made up of a box section 9 feet high by 3 feet wide. The arch ribs have a rise of 120 feet and spring from the canyon walls so that the deck soars more than 325 feet above the floor of the canyon.

There are 1,438 tons of steel in the arch, and a total of 2,326 tons in the bridge. The contract price was \$1,948,638 for the bridge work.

#### Bridge Construction Costs

Bridge construction costs, as measured by the department's cost index, began the year with an index value of 261 which advanced during the succeeding four quarters to 269, 273, 264 and 288. Bridge construction costs were 5 percent higher during the fiscal year 1961-1962 than during the previous year.

On this same route and farther south toward Walnut Creek and Danville 22 bridge structures have been started.

In San Francisco construction started on the Southern Freeway between Ocean Avenue and Mission Street north of Alemany Boulevard. Work was 50 percent completed on the section of the Southern Freeway between Milton Street and the James Lick Memorial (Bayshore) Freeway along Alemany Boulevard.

Among notable projects completed in the Los Angeles area were three contracts for the construction of the Santa Monica Freeway Viaduct linking the Golden State, Santa Ana, and Harbor Freeways. This eight-lane viaduct carries traffic overhead for 4.8 miles through the industrial section of Los Angeles from the Los Angeles River to Hoover Avenue just west of the Harbor Freeway.

On the Golden State Freeway, 40 structures were completed and 34 others are under construction. One of



Construction inside the Collier Tunnel through the Hazelview Summit on U.S. 101 in Del Norte County.



The west portal of the Caldecott Tunnel on Sign Route 24 east of Berkeley.

the completed structures is the half-mile-long Elysian Viaduct which carries the eight-lane Golden State Freeway traffic over the Los Angeles River, adjacent railroad yards, city streets, and at its southerly end develops into a system of curved ramps to make possible the interchange with the Pasadena Freeway. Another major interchange completed on the Golden State Freeway is the Glendale Freeway Interchange which includes eight structures.

Construction along the San Diego Freeway is continuing at a rapid pace. Sixteen new structures were completed and 131 were in various stages of construction at the end of the fiscal year.

Progress continued along the Ventura Freeway with the completion of 11 structures and 40 more under construction. The first sections of the Newport Freeway from the City of Orange to the Riverside Freeway, including 11 structures, were completed. Contracts are underway for 12 more structures along this freeway.

In the San Bernardino - Riverside area, 66 structures were completed and at the close of the year 59 structures were under construction.

In the San Diego area, 43 structures were completed and 54 additional structures are under construction. Among the completed structures in this area is a four-level interchange in the heart of San Diego, connecting U.S. 395 and 101.

#### Other Major Projects

The Randolph Collier Tunnel, located in Del Norte County approximately two miles south of the California-Oregon border on Highway U.S. 199, is to be 1,884 feet long. The tunnel will be concrete lined, will have concrete pavement and provide two 13-foot traffic lanes and safety walks on each side.

Construction of the tunnel started in January 1961. At the end of the fiscal year excavation was well advanced and placement of concrete tunnel lining was in progress. Construction of the tunnel, including the lighting and ventilation system should be completed about the middle of 1963.

Work on the Caldecott Tunnel through the Berkeley Hills on Sign



Route 24 reached the actual tunneling stage in mid-November 1961. Tunneling operations will continue throughout the coming year with completion anticipated in early 1964. The total estimated cost of the tunnel is \$10,500,000.

On the Webster Street Tube all 12 precast tube segments have been towed into place, lowered into position, and backfilled. Work is underway on 812 feet of cast-in-place tube segment on the Oakland end. The \$20 million tube located under the Oakland Inner Harbor between Alameda and Oakland, which should be complete early in 1963, will carry traffic from Oakland to Alameda. The Posey Tube, located one block to the east, will be used to carry traffic from Alameda to Oakland upon completion of extensive renovation.

The past fiscal year saw the completion of two large steel structures on major highway relocations around proposed dams and reservoirs. The first one was the Whiskey Creek Bridge, which carries U.S. 299 over the Whiskey Creek arm of the proposed Whiskeytown Reservoir about 10 miles west of Redding. This structure, costing \$1,100,000, is a welded steel, plate girder bridge. High strength alloy steels were used in the girders to reduce the total weight of steel required.

The other structure, the bridge across the West Branch Feather River, carries relocated U.S. 40 Alternate and the Western Pacific Railroad across an arm of the reservoir which will be formed by construction of the Oroville Dam. This double-deck bridge, carrying four lanes of highway traffic on the upper deck and a single railroad track on the lower deck, is 2,731 feet long and has three unusually large piers, two of which are some 280 feet from foundation to top of pier. Total cost of the bridge was \$8,600,000.

#### County and City Bridges

Advice and assistance continued to be extended to the counties for bridges on the federal-aid secondary system.

The flow of technical aid to the cities was improved through the extension of the duties of county bridge projects engineer to include city projects financed from city apportionments of the gas tax.

Twenty contracts involving 30 FAS bridges valued at \$2,700,000 were awarded during the year.

Of the 30 structures, plans for all but 6 were prepared by county forces. Construction engineering for 24 of the structures is being performed by the counties.

#### Bridge Maintenance

The Bridge Maintenance Section continued the periodic field investigations of the 7,006 bridges on the State Highway System. This includes reports and plans for needed repairs and minor improvements, the review and updating of capacity ratings, and scheduling of replacement of structurally critical bridges as necessary.

On October 25, 1961, a Coast Guard cutter responding to an emergency call from a yacht moored in the small bay at Moss Landing rammed the 12-span, 360-foot long concrete bridge

Bridges on the State Highway System Segregated as to Number, Length and Area by Structure Type, as of June 30, 1962

Structure type	Number		Length <sup>a</sup>	Area <sup>b</sup>
	1962	1961	(feet)	(square feet)
			1962	1962
Concrete arch	239	240	39,469	889,241
Concrete girder	1,892	1,752	417,518	27,034,980
Concrete slab	2,358	2,278	142,932	6,062,911
Masonry arch	33	33	962	21,735
Subtotal concrete and masonry	4,522	4,303	600,881	34,008,867
Steel arch	5	5	1,708	26,760
Steel plate girder	350	339	184,794	7,006,815
Steel stringer	282	285	62,299	3,742,887
Steel deck truss	29	30	24,415	1,196,200
Steel pony truss	30	32	10,609	171,853
Steel through truss	65	69	116,469	1,478,678
Suspension	2	2	15,097	884,145
CMP multiplate and arch	74	67	1,440	48,537
Subtotal steel	837	829	416,831	14,555,875
Timber arch	2	3	343	1,768
Timber stringer	605	622	44,060	2,101,095
Timber deck truss	8	10	1,820	29,335
Timber pony truss	1	1	127	2,899
Timber through truss	1	1	79	1,722
Subtotal timber	617	637	46,429	2,136,819
TOTAL BRIDGES	5,976	5,769	1,064,141 (202 miles)	50,701,561 (1,164 acres)
Underpasses	182	186		
Overheads *	242	223		
Combined bridge and overheads *	48	46		
State highway separations *	272	249		
Road undercrossings *	952	823		
Road overcrossings	725	632		
Pedestrian undercrossings *	157	155		
Pedestrian overcrossings	78	71		
Cattlepasses *	88	84		
Tunnels	20	20	14,199	
Retaining walls	6	6	4,707	
Miscellaneous	19	21	1,909	20,266
TOTAL STRUCTURES	7,006	6,705	1,084,956	50,721,827
Drainage pumping plants	185	180		
Railroad grade crossings	676	682		

\* Separations so noted are listed under structure type above.

Note: One underpass, 18 overheads, 1 tunnel, and 3 bridge and overheads also serve as state highway separations.

<sup>a</sup> Structures of assorted types and lengths of spans are by number and length of main span.

<sup>b</sup> Areas are based upon clear width of roadway between curbs and clear sidewalk width.



Part of the panorama from the Elysian Park view point in Los Angeles showing part of the viaduct (foreground).

across Elkhorn Slough, about 18 miles north of Monterey on State Sign Route 1. One-half the bridge was pushed 18 inches out of line by the impact and some of the concrete piles, caps and a portion of the deck were damaged. Immediate investigation indicated that traffic could continue to use the bridge safely until necessary repairs were made by contract.

A series of minor earthquakes near El Centro in Imperial County caused a wedge of earth at the west abutment of the twin bridges across New

River at Seely on U.S. 80 to slip toward the river. This movement bent and shattered the supporting concrete piles so badly that the structure had to be closed to traffic on February 5, 1962. Repair work started under an emergency contract and the bridges reopened on February 16.

The Bridge Maintenance Section made engineering investigations at the request of local authorities on 67 city and county bridges to establish their load carrying capacity. Thirteen public hearings were held as a result of

which 21 of these bridges were posted for less than legal loads.

As a result of new construction two bridges on the state highway system with load postings and three with speed postings have been dropped from the posted bridge list. On June 30, 1962, there were no bridges on any state highway having a load posting although three ferry crossings are still posted for reduced loads and 34 bridges for reduced speed.

#### Bridge Maintenance Painting

Three maintenance painting contracts on six structures were completed at a cost of \$240,000. Railing revision and repair on one bridge and replacement of bracing members on another was included in one of these contracts. Railings on two bridges on U.S. 99 in District X were repainted.

Despite higher initial painting costs, the annual maintenance unit costs show a downward trend. This reflects increased service life of paint because of more advanced methods of cleaning and application continued rigid inspection techniques and better materials.

Seven experimental sections were painted this year as a part of a continuing paint study program. Evaluation of experimental painting on the Leffingwell bridge on State Route 1 indicates results far better than anything heretofore obtained.

## SPECIAL STUDIES

An expanding program of structural research has permitted investigation of a wide variety of subjects. Nearing completion is a study of the characteristics of a concrete box girder bridge.

Other active research projects concern concrete cracking, the effects of earthquake forces on long piles, the effects of friction on prestressing units in concrete, and the use of epoxy adhesives and sealants.

Most of this work is financed in part by federal-aid highway funds for research and is conducted in co-operation with the Materials and Research Department and the University of

California Institute of Transportation and Traffic Engineering.

The development of electronic computer services for bridge design and analysis has kept pace with growing demand and the installation of improved computing equipment.

Emphasis this year has been on refinement and expansion of an existing program aimed at taking advantage of new computing power and capacity. An example is the mathematical simulation of trucks crossing a bridge, with automatic selection of truck size and position for critical stresses at various locations. This program also provides for distribution of resulting moments and computation of shears

to produce final design data for the bridge superstructure.

Progress has also been made in training bridge engineers to write their own computer programs by means of an automatic coding system. This permits timely programming of problems by those most familiar with their definition and solution. About 50 engineers have received elementary training in the use of this system.

The publication *Bank and Shore Protection in California Highway Practice* was distributed and is receiving wide usage. As in the past, studies in the fields of hydrology, hydraulics, and bank protection are being continued.



## BRIDGE OFFICE ENGINEERING

Bridge office engineering includes the administration and management of the various service units.

A major function is the negotiation and preparation of maintenance and construction agreements with railroads in connection with construction of railroad grade crossings and grade separations.

### Railroad Grade Crossings

Construction was started, underway or completed on 62 highway projects requiring negotiations with railroads which involved right-of-way encroachments, installation of additional crossing protection, construction, alteration or abandonment of grade crossings. At the end of the fiscal year, negotiations with the railroads were in progress for 18 additional

highway projects upon which construction had not yet started. In addition to the above, 29 projects involving improvement of existing crossing protection were completed or underway.

On federal-aid secondary routes, negotiations were underway or completed on 37 projects with railroad involvement.

### Railroad Grade Separation Structures

At the beginning of the year, 70 railroad-highway grade separation structures were under contract. Some 46 grade separation structures were completed during the year. Contracts were awarded for an additional 42 structures. Three of these projects, which were awarded during the fiscal year, have been completed.

## SPECIAL PROJECTS

### Carquinez and Benicia-Martinez Bridges

The Legislature, in the spring of 1955, authorized the construction of two new bridges across the Carquinez Strait, each to be financed by revenue bonds supported by the tolls from both bridges. The new parallel Carquinez Bridge was the first to be built and was opened to traffic on November 25, 1958. The Benicia-Martinez Bridge was opened to traffic in the Fall of 1962, a little more than seven years since passage of the legislation.

Traffic across the new parallel Carquinez Bridge, since the day it opened, has remained well above expectations and has shown an annual increase of approximately 7.5 percent. Total traffic for 1961 of 13,833,083 vehicles indicates the great traffic demand the project is now accommodating.

The \$5,800,000 substructure contract for the Benicia-Martinez Bridge was completed on January 15, 1962, almost three months ahead of schedule, and the last placement of structural steel for the trusses and girders of the superstructure contract was made in May, 1962. The bridge was opened to traffic on September 15, 1962.

The Benicia Freeway approach on the north was placed in use at the time

the bridge was opened to traffic. The south freeway approach was nearing completion and was in partial operation.

The estimated annual traffic across the Benicia-Martinez Bridge is expected to total approximately 2,000,000 vehicles. Toll charges on the Benicia-Martinez Bridge will be identical to those charged at the two Carquinez Bridges, 25 cents for a passenger car with a liberal commuter rate of 10 cents per car.

### Vincent Thomas Bridge

The Vincent Thomas Bridge, connecting San Pedro and Terminal Island, is the third largest suspension bridge in California. This bridge with its main span of 1,500 feet will be an impressive and beautiful structure dominating the landscape in the San Pedro area.

The \$2,650,000 substructure contract begun May, 1961 was completed in June, 1962. Work on the superstructure is progressing on schedule. The two main steel towers have been erected, with spinning of the steel cables to follow. The \$11,400,000 superstructure is due for completion in December, 1963.

The railroads contributed a total of \$275,319 toward 10 of the 49 completed structures.

### \$5 Million Grade-crossing Fund

The Public Utilities Commission issued the 1961 priority list containing 34 proposed separation structure projects to eliminate railroad grade crossings on county roads and city streets. In accordance with state law, \$5,000,000 in state highway funds is set aside by the Highway Commission each year to pay half the cost of each separation project after deducting the railroad contribution.

As of June 30, 1962, allocations totaling \$3,400,285 had been made by the Highway Commission from the 1961-62 fiscal year funds for 7 of the 34 projects on the PUC list.

The \$2,000,000 approaches to the structure, started in February 1962, are due for completion in August 1963. This contract includes the Administration Building and toll booths on the Terminal Island side.

Financing is by tolls to be collected when the bridge is opened to traffic. Estimated cost for construction, right of way, and engineering is \$20,800,000. Of this amount, \$5,000,000 was raised by the sale of revenue bonds. Of the remainder, \$2,000,000 each was loaned by the City and County of Los Angeles and the rest from the State Highway Fund.

### San Diego-Coronado Highway Toll Crossing

The Legislature in 1961 and 1962 set up funds for preliminary studies, plans, and rights of way for the construction of a toll tube or toll bridge across San Diego Bay between San Diego and Coronado.

Studies have been made for five different tube lines and four bridge lines. The bridge studies were for four-lane roadways and the tube studies for two-lane roadways. This was because early estimates indicated that four-

lane tubes would not be financially feasible while four-lane bridges could easily be financed by revenue bonds.

A public meeting was held on June 6, 1962, in the Coronado High School to present the studies and the data that had been collected.

A progress report was made after

the end of the fiscal year to the California Toll Bridge Authority which took action to continue the studies.

#### Personnel

The total Bridge Department personnel was last reported in the 1952 annual report. The following table will fill in this discontinuity:

Year	Total average personnel
1953	565
1954	663
1955	697
1956	786
1957	865
1958	903
1959	926
1960	903
1961	945

## STATE-OWNED TOLL BRIDGES

### San Francisco-Oakland Bay Bridge

A record total of 40,521,508 vehicles crossed the San Francisco-Oakland Bay Bridge during the year. This is an increase of 1.7 percent over the previous year. The daily average for the year was 111,018 vehicles.

The month of highest average daily traffic was June 1962, with a new record high of 115,709 vehicles per day. The previous high was in June 1961, when the daily average was 114,401 vehicles. New high figures for a single day's traffic were established in two successive months during the fiscal year—first on August 18, 1961, with 131,911 vehicles, and again on September 1, 1961, with 133,064 vehicles. Both of these record days were Fridays, and it is interesting to note that every record high day in the history of the bridge has been a Friday. The highest record for the preceding year was 131,826 vehicles on June 16, 1961.

The revenue derived from vehicular tolls, rent, and miscellaneous services, exclusive of interest, was \$12,346,805. This was an increase of \$252,294 over the preceding year.

Reconstruction of the eastbound toll plaza was completed. The rebuilt and enlarged plaza provides 17 toll lanes with all toll booths arranged to collect from the driver's side of the vehicle. The completed plaza was designed to accommodate traffic after the bridge is converted to one-way traffic on each deck.

A contract for remodeling the westbound toll lanes and toll plaza was approved in June 1962. When the proj-



An aerial of the San Pedro-Terminal Island Bridge just after the stringing of the suspension cables over the towers began.

ect is completed, the westbound plaza will also have 17 modern toll lanes.

The contract for major repairs to the timber fenders which protect bridge piers in the navigation channels was completed.

Work was underway on a final contract for 7,560 feet of the lower deck traveler scaffold system which provides for the erection of two rails, each 6,700 feet long, in the East Bay-crossing, and two rails, each 860 feet long, under the continuous spans just west of the suspension bridges. Four traveling platforms, each about 19 feet by 73 feet in dimension will be sus-

pending from the rails. These traveling scaffolds will provide a safer work area for the men and will greatly reduce the man hours the paint crew spends in rigging conventional hanging scaffolds.

The San Francisco Division of Bay Toll Crossings continued work on the \$35,000,000 remodeling which will convert the bridge for five lanes of one-way traffic on each deck.

### San Mateo-Hayward and Dumbarton Bridges

The total traffic on the San Mateo-Hayward Bridge for the year was



4,016,930 vehicles; the toll revenue amounted to \$1,538,851.70. For the same period, the traffic on Dumbarton Bridge was 2,953,758 vehicles, with a toll revenue of \$1,169,311.80. These traffic figures compared to those of the previous year, show traffic increases of 10.2 percent and 19.2 percent, respectively, over the preceding year.

The temporary toll plaza facility at Dumbarton Bridge was improved by adding another toll lane and the installation of electronic toll collection equipment. The temporary plaza was continued in use because of the need for additional time to permit the embankment to settle at the site of the permanent toll plaza on the east approach.

The lift span operation was continued at both bridges, as required by federal law. During the year there were 2,189 lifts at the San Mateo-Hayward Bridge and 1,158 lifts at the Dumbarton Bridge.

The Division of San Francisco Bay Toll Crossings continued operations which will ultimately result in increasing the width of the San Mateo-Hayward Bridge and replacement of the lift span by a high-level structure.

#### **Carquinez Bridge**

A total of 14,104,471 vehicles used the Carquinez Bridges during the year, and \$4,797,666.50 was collected. This was a traffic increase of 5.03 percent over the previous year, and a revenue gain of 4.79 percent. In Janu-

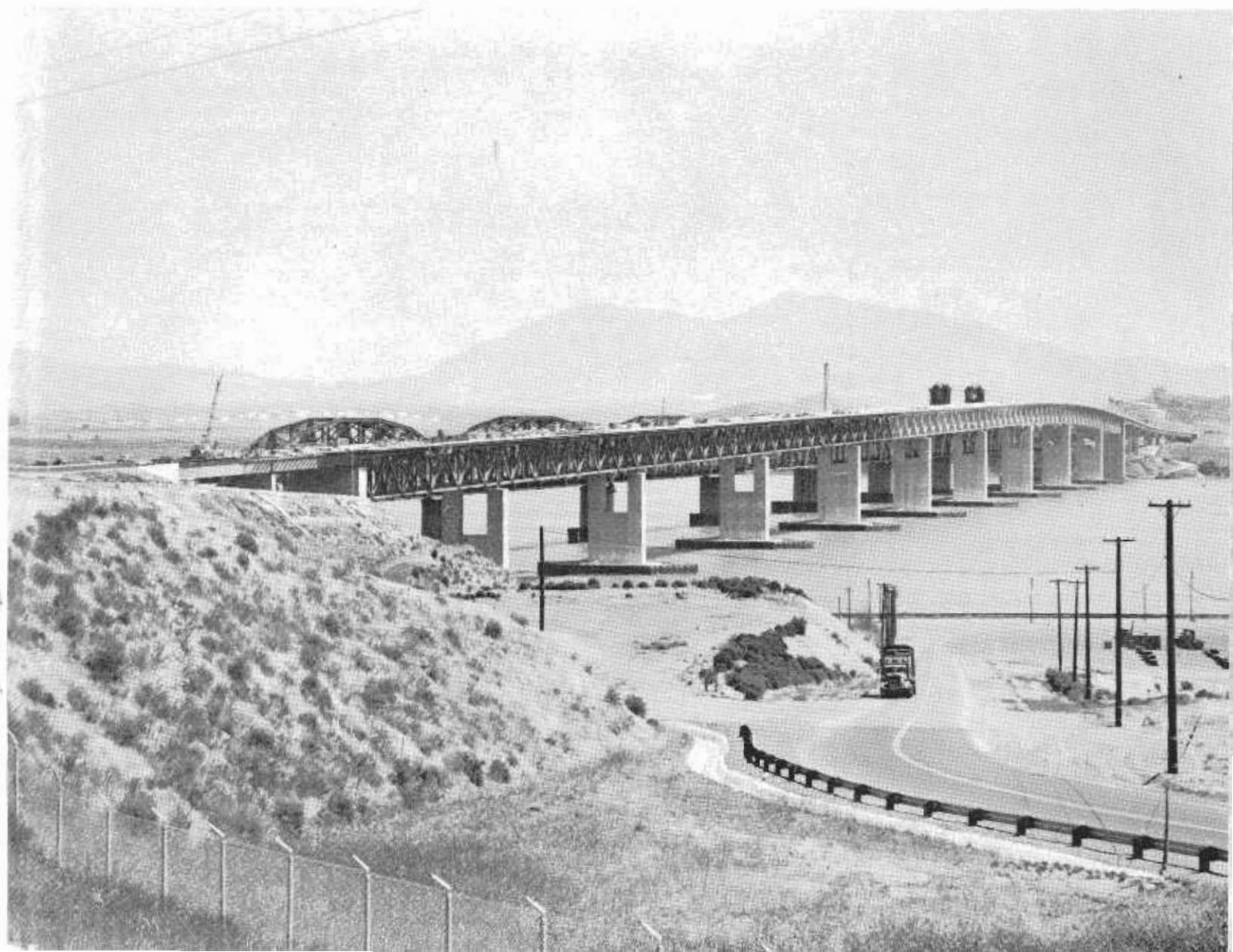
ary 1962, a tow service was established at the Carquinez Bridges to reduce congestion due to stalled cars and to increase safety for the motoring public.

#### **Richmond-San Rafael Bridge**

The total traffic on the Richmond-San Rafael Bridge during the year was 3,737,890 vehicles, and revenue amounted to \$3,115,419.55. These figures represent increases of 7.8 percent and 7.0 percent, respectively, over the preceding year.

Two repair contracts were completed during the year, one to repair serious damage to a timber fender resulting from a ship collision, and the other to replace a prestressed concrete girder which was also damaged by collision with waterborne traffic.

*The new Benicia-Martinez Bridge across the Carquinez Straits between Sonoma and Contra Costa Counties. The highest span has a 138-foot vertical clearance for navigation. The Southern Pacific Company's lift span is visible beyond.*



# • Personnel & Information

- *The functions of personnel, training, safety, audio-visual services and public information are grouped administratively under the direction of the engineer in charge of Personnel and Public Information*

## PERSONNEL

During the past year, the total staff of the Division of Highways increased from 15,421 on July 1, 1961, to 16,017 on July 1, 1962. The engineering staff increased about 380 during this period.

On July 1, 1962, there were 8,288 engineering employees, 3,868 highway maintenance employees, 565 right-of-way employees, 478 equipment maintenance employees, and 2,818 in accounting, clerical, and other miscellaneous functions.

### Recruitment

The primary emphasis again this year was on the recruitment of junior civil engineers, our beginning professional level. Some attempts have also been made to recruit at the next higher level of assistant engineer. As a

result of an intensive nationwide campaign, some 200 new graduate engineers have been added to the staff. Improved recruitment procedures were introduced, including a more comprehensive followup program of job offers. In conjunction with the State Personnel Board, recruiters were sent to an even larger number of colleges than in previous years.

A more comprehensive testing program was introduced for recruiting engineering aids. These examinations are now being held on a continuous basis in all district offices so that applicants can be tested and, if qualified, put to work on a permanent basis with a minimum period of time.

Changes in accounting procedures have also necessitated additional recruitment efforts to locate professional accountants. Examination procedures were improved in highway maintenance

and landscape maintenance classes.

### Personnel Management

Major programs in the past year included putting into effect the health benefits and social security co-ordination programs passed by the 1960 Legislature. This involved furnishing comprehensive initial information on these programs to all employees and establishing systems to maintain up-to-date records.

As a part of the personnel management inventory and classification audit of the division, which is still underway by the Personnel Board, more appropriate classifications were developed for the highway maintenance series including staffing standards and levels descriptions. Improved recruitment procedures were developed to bring closer co-ordination between district and headquarters offices. Studies are underway on the landscape maintenance series and a possible right-of-way engineering series. Complete studies of all accounting departments throughout the State were conducted and a standard organization established resulting in greater use of professional accounting classes to meet the changing needs.

Salary recommendations have been made to the Personnel Board for those classes with recruitment problems or internal salary inequality problems. With the adoption of formal regulations covering employer-employee relations, a statewide program for contact with the various employees' groups was established.

During the year more than 2,000 requests for new or vacant positions were processed. Studies are still underway to establish a machine system for reporting vacancies, both for current use and future planning.

### Statistics

During the year 27 employees were dismissed—5 with permanent status and 22 with temporary status. Twenty-seven were rejected during the probationary period. There were 46 disciplinary suspensions and three disciplinary demotions.

A total of 219 employees retired, bringing to 1,860 the total of those who have retired from the division.

*A recently completed section of the Santa Monica Freeway in downtown Los Angeles.*





One hundred forty-two 25-year awards were given, making a total of 2,126 since the beginning of the program.

Formal training for Division of Highways employees is planned and organized to provide skills and knowledges directly related to division needs and job performance.

This training program, designed to meet division training needs, has included: inservice training sessions given both during state time and after working hours, job rotation, special job assignments, contracts and training agreements with academic and professional institutions, and planned self-study through the use of manuals, guides and books.

During the year 141,171 man-hours of training were conducted in orientation, supervision and management, technical and professional, safety, maintenance, and clerical.

#### **Supervision and Management**

The basic supervisory course, a 14-session 70-hour course, was given in five highway districts. A total of 295

In 1950 the Division of Highways reorganized its safety program and established a Safety Section designed to develop accident prevention methods and obtain statistical information for use in prevention of industrial accidents and injuries and prevention of accidents to state-owned vehicles.

#### **Full-time Supervisors**

Safety supervisors are assigned full time in each of the 11 districts. Part-time safety supervisors are assigned the Bridge Department, State-owned Toll Bridges, Service and Supply, Materials and Research, and Equipment Departments. They investigate accidents and work methods and recommend procedures and protective devices to improve the effectiveness of the safety program. They also check on compliance with regulations rela-

#### **Foreign Visitors**

During the year 64 officials from 34 countries were given training and information. The greatest number of

## **TRAINING**

professional engineers and right-of-way agents participated. Instructors were selected from district middle management. The basic supervisory course is designed to improve a supervisor's proficiency and develop him for future managerial assignments.

Twenty-seven of our top managers participated in the interagency management development program sponsored by the Governor's Committee on Personnel and Training. Examples of courses attended are, "executive management," "fiscal management," and "electronic data processing." Total supervisory and management training time was 30,852 man-hours.

#### **Professional and Technical**

A total of 65,684 man-hours were devoted to professional and technical training in both district and Headquarters sponsored programs. The division's professional and technical programs are attuned to recent de-

## **EMPLOYEE SAFETY**

tive to safety, health and fire prevention.

Safety committees function in each district, in major departments and Headquarters. The district and department committees review industrial accidents to determine appropriate action to prevent recurrence, including, when appropriate, recommendations for disciplinary action. They also review motor vehicle accidents to determine recordability and recommend action for prevention of similar future accidents.

#### **Accidents Are Coded**

Both industrial and motor vehicle accidents involving personnel or equipment of the Division of Highways are coded and annual statistical reports are prepared. The American Standards method of recording and measuring work injury experience has been

these visitors were interested in construction and laboratory procedures.

velopments and techniques. A close relationship is maintained between the division and private industry, colleges and universities, and professional associations. Examples of subjects offered during the year were: materials testing, geodimeter training, right-of-way negotiations, fundamentals of traffic engineering, and I.B.M. 1401.

The junior civil engineer rotation program is designed to give all employees hired as junior civil engineers two years of planned training experience. This year 523 engineers participated.

#### **Special Programs**

Aside from activities in the major training areas, a number of special programs were given to acquaint employees with new statewide and divisionwide procedures and policies such as SERS-OASDI co-ordination, employee appraisal and development and continuous testing program.

adopted as the standard for the reporting and recording of accidents. Frequency and severity rates are compiled monthly and are compared to previous monthly and yearly rates to determine the effectiveness of the program.

#### **Continuous Reduction**

There has been an almost continuous yearly reduction in accident frequency in the Division of Highways since the establishment of a formal safety program. The rate has been reduced, for example, from 49.85 in 1941 to 25.59 in 1950 to 11.85 in 1961 (calendar years). This reduction in frequency has been accompanied by an increase in employees from 5,500 in 1941 to 16,017 in June, 1962.

One value of the accident prevention program is indicated by the reduction in compensation insurance

costs from \$0.80 per \$100 of payroll in 1945 to \$0.58 per \$100 of payroll in 1950 to \$0.27 per \$100 of payroll in 1962.

**Motor Vehicle Accidents**

The Division of Highways, during the calendar year 1962, generated 80,766,683 miles and had a frequency rate of 0.71. The formula used to determine frequency is the number of recordable accidents times 100,000 divided by the total mileage.

Driver training has been given to all employees who drive state-owned vehicles. New employees are given the course and have their driving record

reviewed within three months of their employment. No new employee is permitted to drive a state-owned car until he has been given a road observation run by his supervisor or designated training instructor. They are required to complete the remaining part of the course, consisting of a three-hour lecture and a psychological test, within three months.

**Investigations Held**

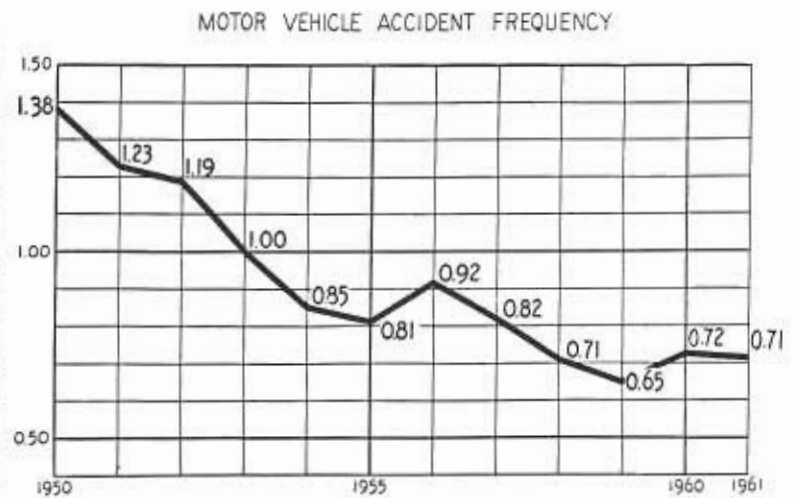
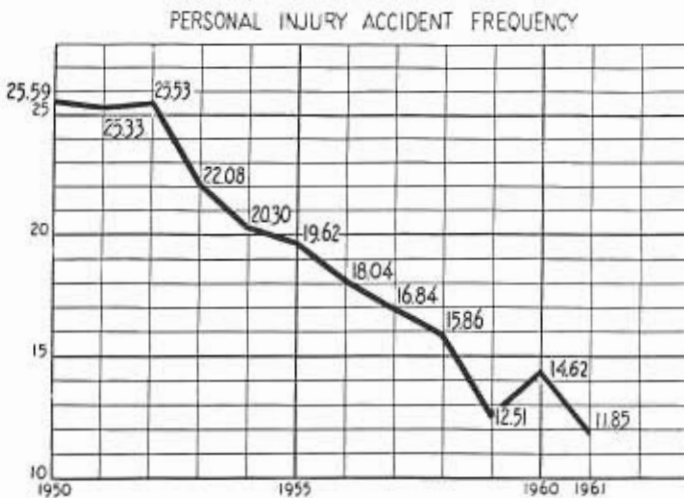
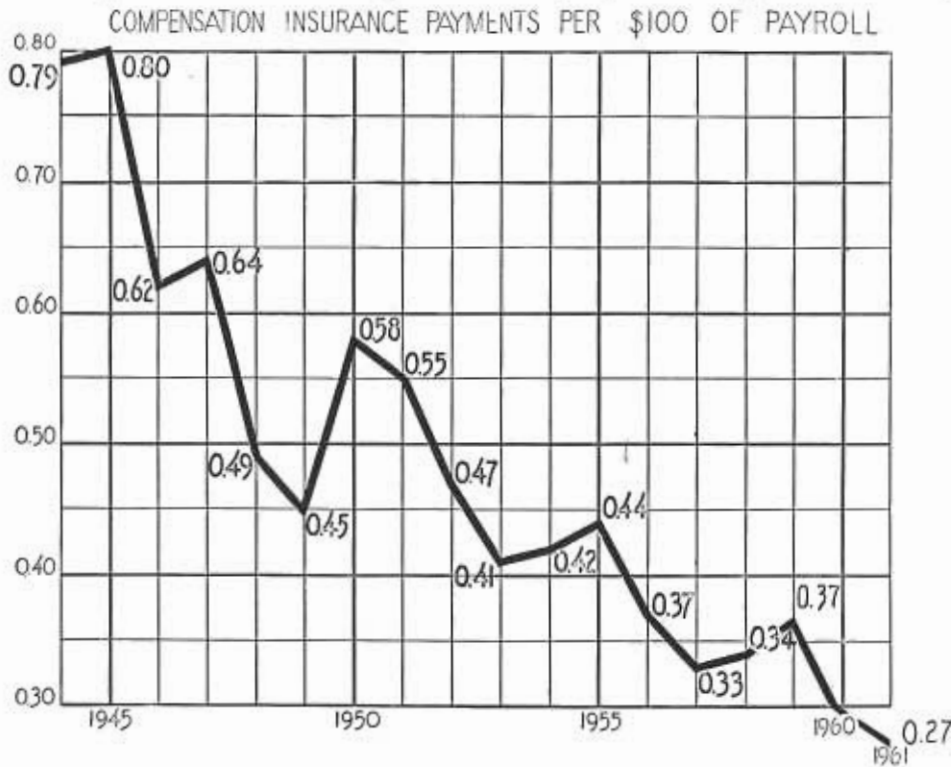
Employees who have had three or more accidents during any one year or whose driving attitude has been questioned are investigated by the district or department safety supervisor.

Conferences are held with the employee and his supervisor and in serious cases are referred to the Division Safety Committee.

A total of 1,875 new employees completed the driver training course in 1961-1962.

**Fire Prevention**

Demonstrations of the use of fire extinguishers were held at various maintenance stations and employees were encouraged to use the demonstration equipment. The importance of yearly inspections of fire extinguishers was emphasized.





### Employee Suggestion Program

The merit award program is coordinated within the Division of Highways by the Safety Section. Work on this activity for the fiscal year 1960-61 is summarized as follows:

Total No. suggestions (incl. WIP's) processed	726
Total cash awards	89
Total amount of cash awards	\$3,849.00
Total No. certificates of commendation awarded	55
Total estimated savings resulting	\$149,949.00

## AUDIO-VISUAL

A wide variety of employee training and public information aids, ranging from simple graphics to booklets and reports, from posters to large exhibits and from slide presentations to filmstrips and motion pictures is produced by the Audio-Visual Section.

The section maintains a large library of colored slides on highway subjects for use in training and public information presentations, along

with a variety of projection and recording equipment. In this connection, counsel is provided to district offices on the type of equipment most suitable for their needs.

Publications designed during the past year included *Report on Scenic Highways and Public Reporting for State Agencies*. Exhibits included the Highway Transportation Agency display for the State, Los Angeles County

### State Liability for Damage Claims

A program covering investigation of accidents where the division may be involved in damage claims is coordinated by the Safety Section between the districts and the Legal Department.

and Fresno District Fairs, and special displays for the American Road Builders Association conference in San Francisco and a scenic highways showing in Marin County.

A motion picture entitled *Freeway Documentary* was completed and is in general use. Motion pictures are also in production on *Slip Form Paving*, *Functions of the Highway Commission*, and other subjects.

## PUBLIC INFORMATION

While wide interest in California's entire highway program continued during the year, special attention was focused on urban freeway development.

This interest in urban freeways was exemplified in the opening on March 30, 1962, of 23 miles of the interstate Santa Monica-Golden State Freeway Loop. It marked a major breakthrough in freeway development for the Los Angeles metropolitan area; since in effect an entirely new route, formed by portions of the two freeways, was added to the metropolitan network.

Of special significance was the fact that an alternate bypass facility skirting the fringes of downtown Los Angeles and more or less paralleling the existing Hollywood Freeway became a reality.

Information on openings such as this and other events was furnished to communications media, and both routine and special news releases were used extensively. Many inquiries by specialist writers were answered and a large number of photographs were made available.

Hundreds of thousands of Californians viewed freeway exhibits, not

only at the State Fair in Sacramento, but also, for the first time, at the Los Angeles County Fair at Pomona and at the Fresno District Fair. The 1962 exhibit was a co-operative effort of the three departments (Public Works, Highway Patrol, Motor Vehicles) comprising the Highway Transportation Agency.



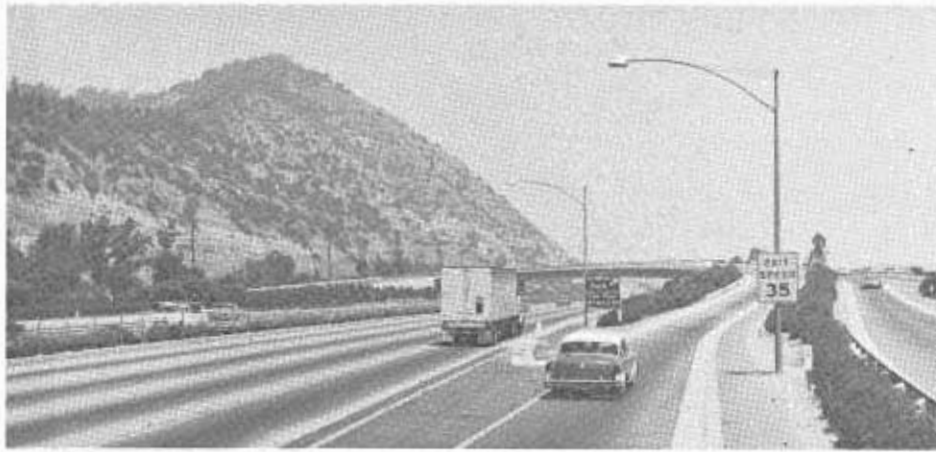
Seedlings for use in freeway landscaping are transplanted at the nursery in the Riverside maintenance yard.

The highways portion included color photographs illustrating freeway design features contributing to traffic safety, and also a freeway scale model. At Sacramento and Fresno the model was the one showing the future Interstate Freeway through the west end of Sacramento, and the surrounding city redevelopment and proposed historical area; at Pomona the model was that of the recently completed four-level U.S. 101-395 interchange in San Diego.

The Division of Highways joined other highway departments throughout the nation in observing National Highway Week May 20-26, as proclaimed by President Kennedy and supported in a statement by Governor Brown. There were luncheons and tours arranged by local civic groups. The various districts co-operated with news media in presenting the highway picture on the local level.

### Publications

The bimonthly magazine *California Highways and Public Works* continued as the principal publication of the Department of Public Works and the Division of Highways. While its main



A landscaped section of the Golden State Freeway in the Griffith Park area of Los Angeles.

distribution is in California to employees of the division and other interested persons, there was a growing demand for it in other states and foreign countries. Numerous articles from the magazine were reprinted and many photographs were furnished to editors and writers for foreign and domestic publications.

Public information material issued in published form included, in addition to regional material prepared by the various districts:

"California Highways—1961," a 12-page illustrated reprint from *California Highway and Public Works* magazine constituting a concise, non-technical version of the division's annual report.

"California's Freeway Planning Team," a leaflet prepared principally for the use of legislators and public service organizations in explaining highway planning procedures.

"California Roadsides," a 38-page reprint of four articles on landscaping and functional planting which appeared in *California Highways and Public Works*.

"Freeway Facts," an illustrated booklet containing basic information about freeways and route adoption procedures, widely used at district public meetings (revised in May 1962).

Reprints of articles and district roundups published in *California Highways and Public Works*, used as informational mailing pieces to answer a wide range of inquiries.

"Clip Sheet," which provides information for use in employee publications issued by each district and some headquarters departments.

"Report to the Governor," a monthly summary of important developments in the work of the Department of Public Works, intended for the information of department heads in state governments and the press.

News releases on routings considered and acted on by the California Highway Commission totaled 146 during the fiscal year, of which 42 were accompanied by maps specially prepared for newspaper reproduction. This was in addition to previous extensive publicity given to route hearings at the district level. Due advance publicity was given seven public hearings scheduled by the commission.

#### Other News Releases and Media Contacts

The quantity and scope of news releases issued by the division continued to increase, especially on the part of the district offices. A large number of photographs of highway projects were supplied to newspapers and magazines on request, particularly on major freeway projects.

Information on the highway program was also issued through telephone calls, office interviews, correspondence and appearances by division personnel on radio and television programs, and before local civic organizations and service clubs.



A maintenance crew repairs a section of median barrier fence on the San Bernardino Freeway.



# • Right-of-Way

- *The Right of Way Department appraises and acquires property required for state highway purposes, manages such property in the preconstruction period and arranges for the removal or relocation of improvements and utility facilities to clear the right-of-way. It also handles appraisals, negotiations and purchases for the Department of Water Resources and the State Public Works Board. The number of people working in right-of-way classes during the year averaged 547.*

During the 1961-62 fiscal year the Right of Way Department completed a new record total of 10,178 property transactions involving an expenditure of \$160,505,567.81. Of these transactions 9,081 involved acquisitions for highway right-of-way, 775 were for utility relocation and 322 for other uses such as for state agencies. The distribution of the total expenditures is as follows:

Highway right-of-way .....	\$141,497,225
Utility relocation to clear highway right-of-way .....	10,315,502
Acquisition other than right-of-way (primarily land purchased for other state agencies) .....	8,692,839

#### Acquisition Policy

The acquisition procedure allows all owners sufficient time to consider the settlement offer and make arrangements to relocate. A request for reso-

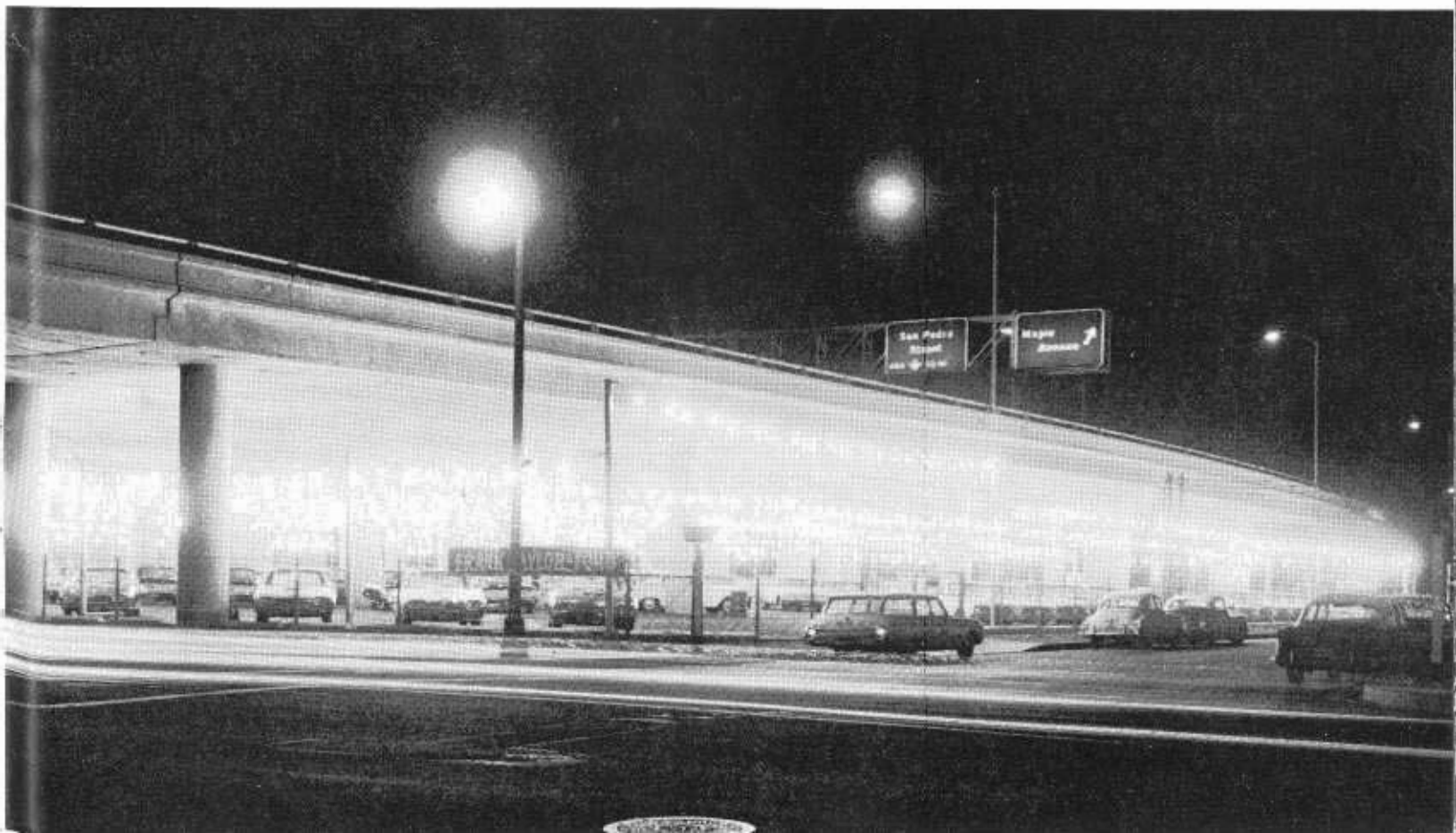
lution of condemnation is not presented to the California Highway Commission until it is clear that a reasonable time for deliberation and decision has been afforded the property owner. Despite pressures of meeting construction schedules, it is imperative to allow sufficient time for the determination of fair market value through the appraisal and negotiation process. In addition, enough notice must be given to assure that persons displaced by highway projects will have adequate time to find a reasonably comparable place in which to relocate.

The effectiveness of the long-standing policy of providing adequate time for appraisal, negotiation and relocation to protect the interest of the property owner, as well as of the State is evidenced by the ratio of negotiated settlements to contested court cases. During the fiscal year, of the 9,081 parcels acquired only 244 or 2.7 percent were obtained through contested eminent domain proceedings.

#### Relocation Counseling

Time, however, is not alone sufficient to facilitate smooth relocation.

*With the completion of the Santa Monica Freeway Viaduct between the Santa Ana and Harbor Freeways, vast parking areas were made available to the public under the structure.*



In order to assure adequate relocation with the least inconvenience to those displaced, a counseling service is provided for those who need assistance in the location of new facilities.

#### **Land Management and Utility Relocation**

This phase of the department's operation included the leasing of 6,551 properties during the interim period between acquisition and clearance of rights-of-way and also included the sale of improvements and excess properties. The fiscal year produced a gross return to the State Highway Fund of \$12,081,509.

#### **Airspace Rights**

Recently enacted federal regulations allowing the use of air space on interstate highways by state governments will have an important effect on growth and development in metropolitan areas. The new regulations, which apply to all highways built with federal funds, include most of the major freeways recently completed or under construction in California. They open up a whole new potential field of construction of public buildings, hotels, apartments, stores and recreational facilities either straddling below-ground freeway sections or set beneath viaduct areas.

The Department of Public Works has for many years leased open-air areas under freeway structures for parking and storage, as permitted under prior legislation. These leases have been on a competitive bid basis.

Excess lands required for right-of-way purposes are returned to private ownership and tax rolls as soon as possible. During the year 974 parcels of excess land were sold or exchanged. These excess parcels were originally acquired to avoid payment of excessive damages or because the remainders were too small or irregularly shaped to be developed economically as individual parcels. The department has combined many small and irregularly

shaped parcels and by this process has returned many desirable sites to public use.

Relocation of utility facilities for proposed highway construction is the responsibility of the Right of Way Department. Relocation costs have increased appreciably in the past 15 years. During this year 775 state utility-owner transactions for relocation totaled \$24,653,977.

#### **Personnel**

The major problem of the Right of Way Department in accomplishing its extensive land acquisition program is still the serious shortage of experienced personnel with knowledge and abilities in four major fields: appraising, acquisition, property management and economic analysis of data concerning community development.

During this year the department lost 48 experienced agents or approximately 9 percent of its total personnel. This percentage loss has been constant for the past five years. Since it takes about three years for even the most qualified new agent to attain the associate or journeyman level, the department has been forced to maintain a constant and intensive training program for new personnel. During 1961-62 more than 20,000 classroom and home-study hours were devoted to right-of-way instruction. This includes attendance at colleges and universities as well as instruction by staff members.

#### **Land Economic Studies**

The Land Economic Studies Section, recently redesignated as the Research and Development Section, performs basic functional and operational research for the Right of Way Department in order to furnish material for public guidance, improve the accuracy of the appraisal process, permit the relation of engineering factors to public requirements, and increase the ef-

fectiveness of negotiations. During the year the section assignments included:

#### *1. Special Economic Studies*

These studies deal with the relationship of engineering factors with the community effects of freeway construction. For example, the section produced "King City—Economic Effects Analysis of Alternate Bypass Route Proposals" and "Crosstown Freeway in the City of Stockton—An Examination of the Possible Effect of Selected Economic Factors on Freeway Design and Construction."

In addition, investigation of what happens to people, homes and businesses displaced by freeways was continued. It is expected that in the near future significant data will be available which will give a comprehensive picture of displacement patterns.

#### *2. Operational Studies*

These studies involve the use of objective measures to investigate and standardize right-of-way practices in order to be able to predict and control lead time and staffing requirements and to improve management techniques. This is a continuing study involving statistical analysis of the variations of more than 10,000 parcels acquired annually.

#### *3. Special Studies*

During the year the section compiled many special studies involving many diverse subjects, e.g., "Practical Liaison at Work," "Excess Lands—California's Concept and Conduct of Marginal Land Acquisition" and "The Importance of Lead Time."

#### *4. Remainder Parcel Studies*

These are continuing studies which deal with property from which a portion was acquired leaving a remainder outside the right-of-way limits. After analysis of about 1,000 parcels during the year this project was turned over to the Appraisal Section as a continuing appraisal project.



# • Legal

## ● The Division of Contracts and Rights of Way is the legal division of the Department of Public Works and renders a variety of legal services to the department and its Division of Highways

Some idea of the volume of the condemnation casework is given by the following tabulation. (The parcel count is based on a count of parcels in condemnation resolutions.)

Suits filed .....	516
Parcels involved .....	2,310
Defendants involved .....	11,998
Suits closed .....	312
Contested trials .....	247
Uncontested judgments .....	216
Default judgments .....	21
Suits pending 7/1/61 .....	684
Suits pending 6/30/62 .....	888

There was a further increase in suits filed as compared to the previous fiscal year—a 12½-percent increase from 458 to 516. The total suits closed, 312, represented total awards of \$14,395,400.37 and represented 1,513 days in court.

### Appellate Cases

During the fiscal year many appellate court briefs were written by the division and appeals argued. Decisions were rendered in *International Oil and Metal Corp. v. State of California*, 204 A.C.A. 617 (22 Cal. Rptr. 568); *Zeppi v. State of California*, 203 A.C.A. 410

(21 Cal. Rptr. 534); *Arques v. State of California*, 199 A.C.A. 246 (18 Cal. Rptr. 397); *People v. Forster*, 199 A.C.A. 386 (18 Cal. Rptr. 828); *People v. Logan*, 198 A.C.A. 607 (17 Cal. Rptr. 674); *Barry v. Department of Public Works*, 199 A.C.A. 380 (18 Cal. Rptr. 637); *Stafford v. Department of Public Works*, 195 Cal. App. (2d) 148 (15 Cal. Rptr. 402); *People v. Neider*, 195 Cal. App. (2d) 582 (16 Cal. Rptr. 58); *People v. Dittmer*, 193 Cal. App. (2d) 681 (14 Cal. Rptr. 560); *Reid v. State of California*, 193 App. (2d) 799 (14 Cal. Rptr. 597); *People v. Podrat*, 194 Cal. App. (2d) 696 (15 Cal. Rptr. 343); *People v. Donovan*, 57 A.C. 374 (19 Cal. Rptr. 473); *Sinclair v. State of California*, 194 Cal. App. (2d) 397 (15 Cal. Rptr. 493); *Flournoy v. State of California*, 57 A.C. 538 (20 Cal. Rptr. 627).

In the case of *International Oil and Metal Corp. v. State of California* the Third District Court of Appeal affirmed the granting of a motion for summary judgment in favor of the State. The court held that the Division of Highways was a bona fide

purchaser of right-of-way for value since the plaintiff corporation had not filed a certificate of merger as required by law prior to the time of the purchase by the State.

In *Zeppi v. State of California* the appellate court reversed the granting of a motion to vacate a judgment in favor of the State. The appellate court held that the *Muskopf* decision, which overturned the long-standing doctrine of sovereign immunity, was not a reason for relieving the plaintiff from the dismissal of his action on the grounds of mistake.

The case of *Arques v. State of California* involved an action for inverse condemnation against the Division of Highways. The appellate court affirmed the trial court's finding that the division was not responsible for decreasing the water depth over the claimant's land, allegedly caused by deposits of fill which were washed down into the bay during construction of a freeway.

The case of *Barry v. Department of Public Works* involved the right to acquire park property for highway purposes. The court held that Section 103.5 of the Streets and Highways Code clearly allowed the Highway Commission to acquire park property for highway purposes when it determined by resolution that necessity existed. The court further held that the question of necessity was not subject to judicial review.

In *Reid v. State* the plaintiff sought to enjoin the Division of Highways from constructing a service road across his property in connection with

BELOW LEFT, the freeway bypass of the City of Dunsmuir in the Sacramento River Canyon. Mount Shasta is in the background. BELOW RIGHT, an aerial view of the freeway between Healdsburg and Santa Rosa in Sonoma County while it was under construction.





the reconstruction of an expressway to a full freeway. The district court affirmed the dismissal of the complaint for the reason that the question of necessity for the condemnation of property for highway purposes was not subject to judicial review and the Division of Highways had the right to construct the service road as a part of the freeway.

In the case of *Sinclair v. State* the district court of appeal held that Section 90 of the Streets and Highways Code (authorizing the department to lay out and construct state highways) was not unconstitutional since it was a sufficient and definite guide to the Highway Commission in the exercise of powers conferred upon it by the Legislature. The court also said that the decisions of the Highway Commission were quasi-legislative and not quasi-judicial. Therefore, they were not subject to judicial review because of an alleged abuse of discretion.

Several other cases are pending before the Supreme Court and the various district courts of appeal, awaiting argument or decision.

#### Other Litigation

In addition to the condemnation proceedings, the department's attorneys handled a large number of miscellaneous cases. The following tabulation covers a wide variety of litigation and indicates the continuing increase in this aspect of the department's work.

At the start of the fiscal year there were 718 cases pending; 475 cases were filed during the year, for a total of 1,193 cases being processed. There were 509 cases closed during the year, with 684 cases pending June 30, 1962.

Some of these cases involve claims for damage to state highway facilities, such as bridges, signals, guardrails, or damage to state vehicles, or unlawful detainer actions. During the fiscal year collections from these cases by the division amounted to \$83,767.85.

The case total includes many cases where the department was represented as a defendant, such as inverse condemnation, suits by contractors for additional compensation on construction contracts, proceedings for damage to public property by reason of state highway operations, suits filed because of alleged dangerous or de-

fective condition of state highways, and suits against the State and its contractors enjoining the construction of highways. Other types of suits, such as stop-notice actions, are defended by the department, and the department has filed interpleader actions in which it assumes a neutral position between the contractor and the party suing on a stop notice.

#### Proceedings Before P.U.C.

The division handles matters before the Public Utilities Commission having to do with crossings of grade at highways and railroads and the construction of grade separations. The following tabulation indicates the volume of work handled by the division in this category:

Applications pending 7/1/61.....	13
New applications filed.....	23
	—
Total applications before P.U.C.....	36
Decisions received .....	25
	—
Applications pending 6/30/62.....	11

Also, 14 proceedings under P.U.C. General Order 88, relating to crossings at grade, were processed. In all instances the approval of the Public Utilities Commission must be obtained as to engineering details and, in the event of a failure to reach an agreement with the railroad involved as to apportionment of cost, the applicant seeks such determination by the P.U.C. The enactment by the Legislature of a new formula for apportionment of cost, except for federal-aid highways, has substantially reduced the number of contested cases.

#### Board of Control and Other Claims

Claims against the state by reason of activities of the department are filed with the State Board of Control. The following tabulation illustrates the increase in the volume of work handled by the department's attorneys before the Board of Control:

	Number of claims	Amount of claims
Pending on 7/1/61..	96	\$4,734,960.09
Filed .....	278	11,861,539.25
	—	—
Total.....	374	\$16,596,499.34
Claims disposed of..	272	8,379,402.54
	—	—
Pending 6/30/62.....	102	\$8,217,096.80

There was an increase of 85 claims filed over the previous year, amounting to \$4,686,375.13. This was an in-

crease of 44 $\frac{1}{7}$  percent. The principal types of Board of Control claims as listed above are for negligence, dangerous or defective condition of state highways, breach of contract and inverse condemnation.

Other claims filed with the department and its employees and the Governor number 38.

The increased number of claims filed with the board is due mostly to the recent decision by the California Supreme Court in the case of *Muskopf v. Corning Hospital District*, 55 Cal. (2d) 211. This decision greatly expanded the liability of the State, particularly for accidents arising out of the dangerous or defective conditions of state highways. The 1961 session of the Legislature enacted Chapter 1404 which placed a moratorium until 90 days after the end of the 1963 session in which suits could be brought against the State. This legislation still permits the filing of claims against the State, but postpones the actual litigation. This enactment will necessitate the careful investigation by Division of Highways personnel of all claims. It is anticipated that because of the *Muskopf* decision the number of claims will increase, as well as the work involved in handling them.

Contractors' claims before the State Highway Engineer's Board of Review for additional compensation have increased notably. These claims have required considerable work, both in analysis and handling claims and in resulting litigation. Directly proportional to the number of Board of Review hearings is the increased number of lawsuits against the department arising out of construction contract claims.

#### House Counsel Work

The "house counsel work" of the division has also shown a decided increase. This work consists of legal opinions directed toward preventing litigation.

Other routine work has increased, such as approval of contracts and leases, reviewing forms and accident reports. This work is directly proportional to the increased volume of the highway program. In addition, there were 25 contested hearings before the State Personnel Board, an increase of 19 over the previous fiscal year.



# • Fiscal • Management

- *Administration of all accounting activities of the Division of Highways is under the direction of the Comptroller of the Division of Highways and his staff*

On June 30, 1962, cash and securities on hand amounted to \$112,302,475, of which \$92,682,040 was invested in U.S. government securities. On the same date, the outstanding obligations in the form of uncompleted construction contracts and day labor jobs, including \$112,787,602 in contracts financed from the ensuing fiscal year budget, were \$362,013,274, of which \$162,680,098 is financed from federal-aid funds and \$5,687,420 by local political subdivisions, state agencies, and others. The remaining \$193,645,756 represents obligations of the State Highway Fund as of June 30, 1962. However, the financing of the obligations is subject to change as additional federal funds become available, and as redeterminations are made of the participating agencies' shares of the cost.

#### **Revenue and Expenditures**

Revenues budgeted for the 1961-62 fiscal year amounted to \$645,833,641, of which \$230,938,931 remained to be collected on June 30, 1962. Revenue not received, which consists of \$222,560,154 of federal aid and \$8,378,777 of contributions from state and local agencies and other sources, will be collected as applicable work is completed or billed. Revenues budgeted for the prior fiscal year amounted to \$597,593,268, the increase in the 1961-62 fiscal year being due primarily by a larger apportionment of federal funds.

Expenditures and obligations incurred applicable to the fiscal year ended June 30, 1962, amounted to \$615,605,477, as compared to \$676,

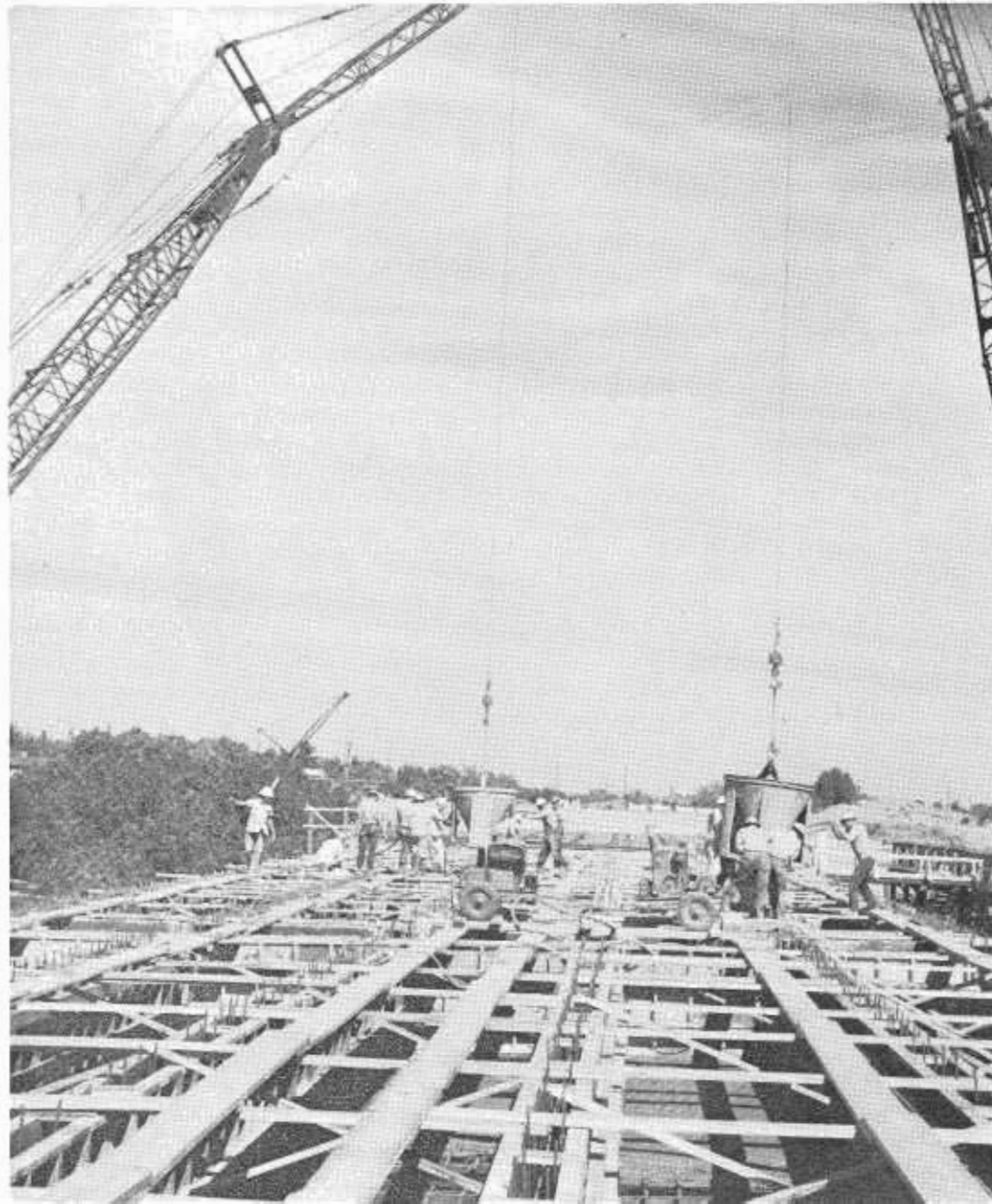
123,729 for the prior fiscal year. As revenue budgeted exceeded obligations incurred by approximately

\$30,000,000, the unobligated budget funds increased from \$83,871,163 on June 30, 1961, to \$116,405,717 on June 30, 1962.

#### **Accounting Procedures**

The accounting system and procedure for highway property rental income in which political subdivisions participate was changed considerably during the year because of the enactment of Chapter 1260, Statutes of 1961, amending Sections 104.6 and 104.10 of the Streets and Highways Code. The statute now provides that, instead of all of such rentals being deposited in a separate fund for subsequent distribution, the State's share of 76 percent shall be retained in the State Highway Fund. This change in the law resulted in the immediate transfer of more than \$4,000,000 in

*Work progresses on the U.S. 99 freeway bypass of Modesto in Stanislaus County.*





prior collections to the State Highway Fund and the retention of 76 percent of current collections, which aggregate approximately \$2,500,000 a year, in the Fund.

The form of contract payment vouchers was revised to permit easier preparation and more expeditious handling.

Chapters 1, 2 and 3 of the *Accounting Manual* were brought up to date. Revised charts of accounts were published in connection with the revised chapters.

End-of-year closing instructions were revised to accommodate changes caused by adoption of electronic data processing for certain accounting procedures.

Procedures for authorizing and accounting preliminary engineering expenditures were improved, in co-operation with the engineering staff, to become operative in the 1962-63 fiscal year. Features of the new procedure include segregation of advance planning and design costs in the control and subsidiary accounts, an improved project numbering system, and the elimination of interoffice transfer of charges relating to fund allotments.

#### **Fiscal Management Organization**

During 1962, all district accounting offices have adopted a uniform organization plan developed by Headquarters Fiscal Management and Personnel Departments. This plan changes the title of the heads of the district accounting departments from chief clerk to chief accounting officer and increases the professional accounting staff in the district offices. Nonaccounting functions have been removed from district accounting departments. Accounting functions previously performed elsewhere in some districts, such as co-operative project accounting, or right-of-way rental accounting, have been transferred to district accounting departments. These changes in personnel classifications and functional alignment should lead to improved performance of the accounting function and enable the district accounting departments to furnish more meaningful reports to district engineers in time to be of value in current operations.

Headquarters Fiscal Management has established a new unit to audit re-



*The south end of the Harbor Freeway in Los Angeles looking toward the harbor area in San Pedro.*

location billings of railroads and public utilities. When projects with federal participation are being audited, the salaries and expenses of the audit personnel will be reimbursed by the federal government.

The staff working on the "concurrent audit" project has been increased to fulfill the requirements for acceptance of this program by the Bureau of Public Roads.

#### **Electronic Data Processing**

Effective July 1, 1961, expenditure cost analysis records were placed on a data processing system. The initial entry into data processing covered an analysis of costs as to location (district, county, route, and section), source (who did it), activity (what was done), and object of expenditure. The Systems and Procedures Unit, in co-ordination with the Data Process-

ing Center, is developing programs, for the 1401 computer, to produce expenditure analysis and management reports. Reporting will show project costs and provide, for comparative purposes, cost analyses as to functions.

As with all new data processing installations, problems have been encountered. Commencing in March 1962, regular meetings were held between personnel of the Data Processing Center and Headquarters Fiscal Management. These joint discussions have led to many improvements, including the introduction of consistency checks for cost distribution codes.

Both Headquarters and district accounting personnel are being trained in data processing. A pilot program for district chief accounting officers is planned. Selected Headquarters accounting personnel have had limited data processing training.



# • 1963-64 Budget

## • *Proper Balance Between Interstate, Noninterstate Road Needs Is Goal*

The California Highway Commission on October 19 adopted a record \$695,927,042 state highway budget for the 1963-1964 fiscal year.

The budget contains \$554,677,084 for state highway construction purposes, including rights-of-way.

The previous budget, adopted in October 1961, contained an overall total of \$658,370,017, of which \$527,792,917 was for construction purposes.

State Director of Public Works Robert B. Bradford, Commission Chairman, said the budget is up from last year as a result of increases in federal apportionments for the interstate system in California and in estimated revenue from state highway user taxes.

A total of \$305,606,000 in federal funds has been allotted to California for 1963-64, including \$247,917,800 for work on interstate highways. The corresponding totals for 1962-63 were \$286,631,017 and \$228,847,200.

### **State Revenue Up**

Estimated revenue from state sources is up about \$13,700,000, most of it from highway user taxes on gasoline and diesel fuel, indicative of the continuing increases in travel mileage by the State's motorists and truckers.

The budget provides funds for 218 projects including construction of 267 miles of multilane freeway, 31 miles of multilane expressway, 23 miles of two-lane expressway (planned for future expansion to four lanes divided), and widening 26 miles of existing freeways.

"This budget," Bradford said, "represents a conscientious effort to balance the construction progress on the national interstate highway system, for which substantial funds are committed by the federal government, with the most urgent needs on the noninterstate routes.

"The commission has tried, as always, to get the most in traffic safety and efficiency in every corner of the State out of every available dollar. If additional funds turn up from any source, including favorable bids, we will be prepared to put them to work in the form of additional construction projects without delay."

Major sources of state-collected highway revenue expected for 1963-64 include \$282,736,000 in gasoline taxes; \$60,308,000 in motor vehicle fees; \$25,300,000 from the use fuel (diesel) tax; \$13,850,000 from transportation taxes on for-hire carriers; and interest on investments and deposits, \$3 million (up \$300,000).

The budget contains \$63,777,958 for functions other than state highway work.

The largest non-state-highway item is \$38,142,708 for major city streets, based on five-eighths cent per gallon of the state gasoline tax. Other non-state-highway items are:

Federal aid for county roads on the federal aid secondary system, \$8,884,750; state funds to counties for use in matching these federal funds, \$4,350,000; state funds to help finance railroad grade separation projects on local

streets and roads, \$5,000,000; engineering funds to cities, \$1,350,000; and state funds to pay part of the cost of urban extensions of FAS county roads, \$1,050,500.

### **Portion for County Roads**

Bradford pointed out that California's 58 counties receive 1½ cents per gallon from the State's 6-cent-per-gallon gasoline tax, plus a portion of the motor vehicle fees. These funds are disbursed directly by the State Controller and are not listed in the State Highway Budget.

For the 1963-64 fiscal year, these state-collected funds for county roads will total an estimated \$98,600,000.

The \$554,677,084 in the budget for highway construction purposes includes:

Major construction and improvement (including engineering), \$384,660,000; rights-of-way, \$156,017,084; contingencies, \$6,000,000; resurfacing program, \$5,000,000; signs and striping, \$2,000,000; and minor improvements, \$1,000,000.

Proposed expenditures for state highway purposes other than construction include: maintenance, \$49,000,000; buildings and plants, \$9,000,000; administration, \$12,075,000; statewide highway planning survey, \$3,400,000; maintenance of state toll bridges, \$2,750,000; and honor camps, \$1,100,000.

The 1963-64 budget contains 28 landscaping and other planting projects, including trees, for which \$3,176,000 is budgeted.

# 1963-64 State Highway Budget Projects by Counties

Note 1: Construction contracts may be awarded beginning January 1963. Right-of-way funds may not be spent until July 1, 1963 (start of the fiscal year).

Note 2: Projects which overlap county lines are listed in both counties.

Note 3: The term "freeway" means a multilane divided highway with full access control, no crossings at grade, no stoplights and no left-turn movements. As used here, an "expressway" is a multilane divided highway with most full freeway features except that traffic may cross at grade at some intersections. "Two-lane expressway" is a two-lane highway with some measure of access control, usually planned for future expansion to four lanes divided.

Route	Description	Approx. mileage	Estimated cost
<b>ALAMEDA COUNTY</b>			
US 50 (Interstate 5W)	Landscape MacArthur Freeway between Park Boulevard and Buell Street in Oakland.....	2.9	\$360,000
US 50, SSR 24 (Interstate 5W)	Portion of interchange between MacArthur and Grove-Shafter Freeways in Oakland.....	0.5	6,235,000
SSR 24	0.75 mile of 8-lane freeway and portions of the interchange between State Sign Route 24 and the Warren Freeway in Oakland.....	1.5	3,750,000
SSR 21 (Interstate 680)	6-lane freeway between 0.4 mile south of US 50 and 1 mile north of the Alameda-Contra Costa county line.....	3.0	7,500,000
SHR 227	Landscape Warren Freeway at the Moraga Avenue Interchange in Oakland.....	0.5	45,000
FAS 1030	Widen Redwood Road to 4 lanes between Joseph Drive and Reyer Avenue in Hayward area. (Urban extension of federal aid secondary county road. Alameda County's share, \$150,000)	0.4	150,000
Urban Extension	Widen Lake Chabot Road to 4 lanes between Keith and Carlton avenues in Hayward area. (Urban extension of FAS County Road. Alameda County's share, \$140,000)	0.7	140,000
FAS 1031			(State's share)
Urban Extension			16,375,000
Various	Rights of Way (includes \$5,500,000 for US 50 Freeway in San Leandro-Castro Valley area and \$6,500,000 for Grove-Shafter Freeway in Oakland)		
<b>ALPINE COUNTY</b>			
SSR 68	Resurface between Amador county line and Carson Pass Summit.....	5.3	180,000
Various	Rights of Way.....		30,000
<b>AMADOR COUNTY</b>			
SSR 49	Reconstruct and widen between Calaveras county line and 1.3 miles north.....	1.3	850,000
Various	Rights-of-way.....		90,000
<b>BUTTE COUNTY</b>			
US 99E	4-lane freeway between Centerville Road and Big Chico Creek in Chico.....	2.6	2,300,000
US 99E	Landscape and tree planting between East Ninth Street and East First Avenue in and near Chico.....	1.1	95,000
US 40 Alt.	Tree planting between south of the South Oroville Separation and Wicks Corner.....	6.5	10,000
Various	Rights-of-way.....		360,000
<b>CALAVERAS COUNTY</b>			
SSR 4	Widen between Ganns Meadow and 5.5 miles east.....	5.5	1,050,000
SSR 49	Pave between State Sign Route 13 north of San Andreas and Mokelumne Hill. (Grading and structures under way).....	6.5	600,000
Various	Rights-of-way.....		200,000
<b>COLUSA COUNTY</b>			
Various	Rights-of-way.....		550,000
<b>CONTRA COSTA COUNTY</b>			
SSR 21 (Interstate 680)	6-lane freeway between 0.4 mile south of US 50 and 1 mile north of the Alameda-Contra Costa county line.....	3.0	7,500,000
Various	Rights-of-way.....		1,410,000
<b>DEL NORTE COUNTY</b>			
US 101	Clear and grade for ultimate 4-lane freeway between 0.9 mile south of the Del Norte county line and 1.1 miles south of Klamath.....	5.0	4,100,000
Various	Rights-of-way.....		350,000
<b>EL DORADO COUNTY</b>			
US 50	Tree planting between Fairgrounds Interchange and Placerville.....	1.9	5,000
US 50	Widen to 4 lanes and improve alignment between 1.6 miles east of Placerville and 0.3 mile west of Five Mile Terrace.....	1.7	420,000
US 50	4-lane freeway between 0.3 mile east of Camino and 1.1 miles east of Sly Park Road.....	6.6	4,590,000
SSR 49	Widen between 0.8 mile south of Greenwood Creek and 0.4 mile north of South Fork of American River.....	1.5	170,000
Various	Rights-of-way.....		320,000
<b>FRESNO COUNTY</b>			
SSR 41	2-lane expressway between North Fork of Kings River and 0.1 mile north of Elkhorn Avenue in Fresno County, with a 1 mile 4-lane freeway section at the Excelsior Avenue Interchange at the Kings-Fresno county line.....	7.2	2,050,000
FAS 564	Widen Dinuba Avenue from 2 to 4 lanes between Frankwood Avenue and the east city limit of Reedley, and install automatic warning signals at railroad crossing. (Urban extension of FAS county road. Reedley's share, \$116,000)	0.6	116,000
Urban Extension			(State's share)
FAS 823	Widen Frankwood Avenue between Stanley and Dinuba Avenues in Reedley. (Urban extension of FAS county road. Reedley's share, \$20,000)	0.5	20,000
Urban Extension			
Various	Rights-of-way.....		3,049,000



Route	Description	Approx. mileage	Estimated cost
<b>GLENN COUNTY</b>			
SHR 45	Widen between 1 mile and 0.5 mile west of the Glenn-Butte county line	0.5	\$200,000
Various	Rights-of-way		215,000
<b>HUMBOLDT COUNTY</b>			
US 101	Clear and grade for ultimate 4-lane freeway between 0.9 mile south of the Del Norte county line and 1.1 miles south of Klamath	5.0	4,100,000
US 101	Widen bridge across Bear Gulch north of Garberville and realign approaches	0.4	75,000
US 101	Planting, including trees, between Eureka and Arcata		25,000
US 101	4-lane freeway between Mad River and 0.2 mile north of Little River	7.9	4,950,000
US 101	Widen and resurface between 3.2 and 6.4 miles north of Arcata	2.7	65,000
SSR 36	Widen and improve alignment between 1.1 miles east of Hydenville and 0.5 mile west of Carlotta	0.7	220,000
SSR 36	Widen portions and ease curves between 1.3 and 10 miles east of Bridgeville	1.0	100,000
SHR 96	2-lane expressway between Van Ness Avenue in Ferndale and 0.5 mile south of Fernbridge	3.3	850,000
Various	Rights-of-way		840,000
<b>IMPERIAL COUNTY</b>			
US 80 (Interstate 8)	Two eastbound lanes between the San Diego county line and State Sign Route 98, making this section a 4-lane freeway (westbound lanes under construction)	9.7	3,000,000
US 80 (Interstate 8)	Replace bridges over Westside Main Canal and Bullhead Slough in and east of Dixieland		150,000
US 99	Widen to 4-lane city street between Third Street and Birch Street (State Sign Route 98) in Calexico	0.8	200,000
SSR 111	Widen between Brawley and Calipatria	9.5	110,000
Various	Rights-of-way		1,197,000
<b>INYO COUNTY</b>			
US 6	Extend abutments and replace decking on bridge across Upper McNally Creek, north of Bishop		20,000
Various	Rights-of-way		20,000
<b>KERN COUNTY</b>			
US 99 (Interstate 5)	Convert 4-lane expressway to 8-lane freeway between just north of Los Angeles county line and Fort Tejon	4.7	2,900,000
US 99 (Interstate 5)	Truck shelter and tool room at Wheeler Ridge Scale and Brake Inspection Station		104,000
US 99	Planting, including trees, on portions between 1 mile south of Sherwood Avenue in McFarland and Kings River in Tulare County		125,000
SHR 141	Widen Brundage Lane to 4 lanes between Union Avenue and Oak Street in Bakersfield	2.0	560,000
SHR 142	Widen portions between 1.6 miles west and 8 miles east of Glennville	9.6	100,000
US 466	Grade for future 4-lane freeway between 0.5 mile east of Keene and 0.8 mile west of Tehachapi Overhead	7.6	4,100,000
Various	Rights-of-way		2,498,000
<b>KINGS COUNTY</b>			
SSR 198	4-lane freeway and expressway between 0.3 mile west of State Sign Route 41 and 11th Avenue in Hanford; reconstruct Third and Fourth Streets to 10th Avenue as a one-way couplet; connection on 10th Avenue to the existing highway	10.4	4,550,000
SSR 41	2-lane expressway between North Fork of Kings River and 0.1 mile north of Elkhorn Avenue in Fresno County, with a 1 mile 4-lane freeway section at the Excelsior Avenue Interchange at the Kings-Fresno county line	7.2	2,050,000
Various	Rights-of-way		470,000
<b>LAKE COUNTY</b>			
SSR 29	Replace bridge across Putah Creek north of Middletown on new alignment and construct approaches	0.6	200,000
SSR 29	Replace bridges across McGough Slough, Adobe Creek and Hill Creek and extend eight culverts between McGough Slough and Ackley Road near Keiseyville		150,000
SHR 243	Replace bridge across Seigler Creek west of Lower Lake		25,000
Various	Rights-of-way		50,000
<b>LASSEN COUNTY</b>			
US 395	2-lane expressway between Mesa Street in Susanville and a mile southeast of Johnstonville	4.8	1,030,000
Various	Rights-of-way		20,000
<b>LOS ANGELES COUNTY</b>			
US 101	Landscape portions of Hollywood Freeway between 0.2 mile southeast of Moorpark Street and Magnolia Boulevard	1.1	135,000
US 101	Install additional signs on Ventura Freeway between San Diego Freeway and Encino Avenue		70,000
US 101	Convert 4-lane Ventura Freeway to full freeway between west city limit of Los Angeles and Las Virgenes Canyon Road		1,200,000
US 101	Convert 4-lane Ventura Freeway to full freeway between 0.3 mile west of Las Virgenes Canyon Road and 0.4 mile southeast of Chesebro Road Overcrossing at Agoura		690,000
US 6-99 (Interstate 5)	Widen portions of Golden State Freeway to eight lanes between 0.2 mile south of Western Avenue in Glendale and 0.2 mile north of Alameda Avenue in Burbank	0.7	135,000
US 99, SSR 126 (Interstate 5)	8-lane US 99 Freeway between 0.9 mile south of Santa Clara River and 0.4 mile north of Castaic Interchange, and 4-lane SSR 126 Freeway from US 99 to 0.8 mile westerly	4.5	5,950,000
US 99 (Interstate 5)	Improve drainage facilities at Marple Canyon about 4.5 miles north of Castaic		95,000
US 99 (Interstate 5)	Seal coat between 2.0 and 12.7 miles north of Castaic	10.7	150,000
SSR 118	Widen portions of Devonshire Street to four lanes between Topanga Canyon Boulevard and DeSoto Avenue in Chatsworth area in Los Angeles. (City's share, \$191,000)	1.0	130,000
SSR 118	Widen Devonshire Street to four lanes and install traffic signals and highway lighting between Zelzah Avenue and Sepulveda Boulevard near San Fernando	3.2	515,000
SSR 118	Widen Foothill Boulevard to four lanes between Vaughn and Fenwick Streets in Sunland area	5.5	950,000
SSR 118	Reconstruct roadway on Lincoln Avenue between Canada and Forest Avenues in Pasadena	0.9	70,000
US 6	4-lane Antelope Valley Freeway between 0.5 mile west of Red Rover Mine Road and 0.5 mile north of Angeles Forest Highway near Vincent	7.9	3,300,000
SSR 138	Reconstruct shoulders of Pearblossom Highway between 57th Street East, west of Little Rock, and Palmdale-Victorville Road east of Liano	17.8	200,000

Route	Description	Approx. mileage	Estimated cost
LOS ANGELES COUNTY—Continued			
US 101 Alt.	Reconstruct shoulders and surface Pacific Coast Highway between Avenue I and Pacific Avenue in Redondo Beach.	2.5	\$75,000
SSR 37	Widen Topanga Canyon Boulevard to four lanes divided between Roscoe Boulevard and Devonshire Street near Chatsworth. (Los Angeles County Flood Control District's share, \$39,000)	2.7	900,000 (State's share)
SSR 7 (Interstate 405)	Landscape San Diego Freeway between Mulholland Drive and 0.2 mile north of Ventura Boulevard.	1.6	200,000
SSR 7	Surface and correct drainage on Sepulveda Boulevard between Burbank Boulevard near Van Nuys and 0.9 mile north of Rinaldi Street near San Fernando prior to relinquishment to City of Los Angeles	5.2	160,000
SSR 134	Landscape Ventura Freeway between Hollywood Freeway and Buena Vista Street in Burbank.	3.0	175,000
US 44	Install and modify traffic signals at 33 intersections on Colorado Boulevard between Vernon and Sunnyslope Avenues in Pasadena. (City's share, \$117,000)		125,000 (State's share)
SSR 15	6-lane Long Beach Freeway between San Bernardino Freeway at north city limit of Monterey Park and Valley Boulevard in Los Angeles; construct embankment and drainage facilities between Woods and Findlay Avenues in Monterey Park for future Pomona Freeway	2.0	2,400,000
SSR 35 (Interstate 605)	Construct overcrossings for future San Gabriel River Freeway at Centralia Road and 195th Street in and near Dairy Valley.		680,000
SSR 35 (Interstate 605)	8-lane San Gabriel River Freeway between 166th Street in Dairy Valley and Cecilia Street at Norwalk-Downey city limit.	2.6	10,350,000
SSR 35 (Interstate 605)	8-lane San Gabriel River Freeway between Cecilia Street at Norwalk-Downey city limit and 0.4 mile north of Telegraph Road in Santa Fe Springs, including interchange with Santa Ana Freeway	1.8	7,200,000
SSR 35 (Interstate 605)	8-lane San Gabriel River Freeway between 0.4 mile north of Telegraph Road in Santa Fe Springs and 0.3 mile north of Whittier Boulevard, northwest of Whittier	3.2	7,200,000
SSR 35	Widen Pioneer Boulevard-San Antonio Drive-Norwalk Boulevard and install and modify traffic signals between 166th Street and Lakeland Road in Norwalk. (City's share, \$364,262)	3.8	290,000 (State's share)
SHR 172	8-lane Pomona Freeway between Santa Ana Freeway and Third Street in East Los Angeles, and construct embankment and drainage facilities and adjust sewers and streets between Findlay Avenue and Markland Drive in Monterey Park and Montebello	3.4	2,400,000
SHR 172	Resurface Third Street between Indiana and Petherly Streets in East Los Angeles.	1.8	75,000
SHR 172	Widen Potrero Grande Drive between Pomona Boulevard in Monterey Park and Hill Drive in South San Gabriel.	1.7	150,000
SSR 26 (Interstate 10)	8-lane Santa Monica Freeway between US 101 Alternate in Santa Monica and San Diego Freeway in Los Angeles.	3.7	7,500,000
SSR 14	Construct channelization and modify traffic signals at nine intersections on Artesia Boulevard between Pier Avenue in Manhattan Beach and Hawthorne Boulevard in Lawndale. (Manhattan Beach's share, \$3,000; Redondo Beach, \$65,000; Lawndale, \$5,000)		125,000 (State's share)
SSR 14	Modify traffic signals at seven intersections on Artesia Boulevard between Normandie Avenue in Gardena and Wilmington Avenue. (Gardena's share, \$11,250; Los Angeles, \$10,750; County, \$32,250)	3.7	55,000 (State's share)
SSR 14	Widen Artesia Boulevard and relocate traffic signals between Gridley Road and 0.1 mile east of Pioneer Boulevard in Artesia. (City's share, \$35,300)	0.6	85,000 (State's share)
US 101, 60, 70, 99 (Interstate 405, 10)	Install reflectorized guide markers on San Diego Freeway between San Diego county line and Santa Ana Freeway; on Santa Ana Freeway between San Diego and Hollywood Freeways, and on San Bernardino Freeway between Long Beach and Santa Ana Freeways in Los Angeles and Orange Counties		55,000
SSR 35 (Interstate 605)	8-lane San Gabriel River Freeway between San Diego Freeway and 0.3 mile north of Katella Avenue near Los Angeles county line.	2.4	5,500,000
Various	Rights-of-way (including \$11,500,000 on Foothill Freeway; \$9,000,000 on SSR 134 Freeway in Glendale and Eagle Rock; \$7,900,000 on Artesia (Route 175) Freeway; \$4,200,000 on San Gabriel River Freeway; \$2,500,000 on Glendale Freeway; and \$2,250,000 on Pomona Freeway)		55,975,000
MADERA COUNTY			
SSR 144	Raise grade on portions between 0.4 mile and 4 miles north of the Fresno-Madera county line.	3.6	60,000
Various	Rights-of-way.		341,000
MARIN COUNTY			
US 101	Additional lane, resurface, and additional signs on portions of US 101 between Golden Gate Bridge and foot of Waldo Grade.	3.5	300,000
US 101	Reconstruct shoulders and install underdrains on portions between Atherton Avenue north of Novato and Marin-Sonoma county line.		140,000
US 101	Median barrier between north end of San Rafael Viaduct and 0.2 mile north of Willow Avenue in San Rafael.	1.9	130,000
US 101	Landscape between 0.6 mile south and 0.4 mile north of Freitas Parkway in San Rafael.	1.0	100,000
Various	Rights-of-way.		265,000
MARIPOSA COUNTY			
Various	Rights-of-way.		70,000
MENDOCINO COUNTY			
US 101	Structures for future 4-lane freeway between Robinson Creek and 0.2 mile north of State Street, north of Ukiah.	3.8	2,200,000
US 101	Widen to four lanes between 0.3 mile south of Willits and California Western crossing in Willits (City's share, \$37,000)	1.4	410,000 (State's share)
US 101	Widen and truck passing lane between 1.0 and 3.5 miles north of Laytonville.	2.3	600,000
SSR 1	2-lane expressway between 1.3 miles south of Big River and Russian Gulch, north of Mendocino.	2.8	775,000
SSR 1	Replace bridge across DeHaven Creek north of Westport on new alignment and construct approaches.	1.1	390,000
SSR 1	Replace bridge across Millbank Creek west of Leggett with culvert.	0.2	35,000
Various	Rights-of-way.		525,000
MERCED COUNTY			
SSR 140	Widen and improve drainage near Kibby Road east of Merced.	0.2	50,000
SSR 152	4-lane expressway between 1 mile west of Merced county line in Santa Clara County and 1.8 miles west of State Sign Route 33. (Relocation around San Luis Reservoir which will inundate the existing highway.) The Department of Water Resources has reserved \$11,600,000 toward the project	12.4	5,000,000 (State Highway Fund share)
SSR 152 (Interstate 5)	Construct a bridge on SSR 152 over the future San Luis Canal 10 miles west of Los Banos; a bridge across the canal for the future Westside Freeway (Interstate 5), a mile northwest of the SSR 152 bridge; and portions of an interchange between SSR 152 and the Westside Freeway. (To be included in US Bureau of Reclamation's 18 mile canal project)	1.6	980,000 (State's share)
SSR 152	Widen to 4 lanes between Ortigalita Road and Nevada Street and between Mercy Springs Road and Nickel Street in Los Banos.	1.5	400,000
Various	Rights-of-way.		355,000
MODOC COUNTY			
US 299	2-lane expressway between 4.5 and 8 miles east of Adin.	3.3	685,000
Various	Rights-of-way.		50,000



Route	Description	Approx. mileage	Estimated cost
<b>MONO COUNTY</b>			
SSR 120 (Tioga Pass Road)	2-lane expressway between 8.6 and 10.6 miles west of Lee Vining .....	2.0	\$1,285,000
Various	Rights-of-way .....		200,000
<b>MONTEREY COUNTY</b>			
US 101	4-lane freeway between the San Luis Obispo-Monterey county line and 1.6 miles north of Gate One of Camp Roberts .....	2.4	1,270,000
US 101	4-lane freeway between 0.2 mile south of North Main Street in Salinas and 0.5 mile north of Espinosa Road .....	4.5	2,850,000
SSR 1	Replace bridge across Vicente Creek near Lucia and construct approaches .....	0.4	445,000
SSR 1	Grade for future 4-lane freeway between 1.2 miles south of Pajaro River and Santa Cruz-Monterey county line .....	1.2	600,000
SHR 118	Widen Salinas-Castroville Highway to 4-lane city street and resurface between Main Street in Salinas and 0.1 mile west of the west city limit .....	1.2	220,000
Various	Rights-of-way .....		1,325,000
<b>NAPA COUNTY</b>			
SSR 29	4-lane freeway between Old Sonoma Road in Napa and Napa Creek, and resurface existing 2 lanes between Napa Creek and 0.2 mile south of Trancas Street in Napa .....	2.2	980,000
Various	Rights-of-way .....		775,000
<b>NEVADA COUNTY</b>			
SSR 49	Widen portions between 1.5 miles north of South Fork of Yuba River and North San Juan .....		50,000
US 40 (Interstate 80)	Pave 4-lane freeway between Soda Springs and 1 mile west of junction with State Sign Route 89 west of Truckee. (Completes Donner Summit relocation) .....	10.6	5,455,000
SSR 89	Resurface and improve drainage between Donner Creek Underpass southwest of Truckee and 3.6 miles south .....	3.6	190,000
Various	Rights-of-way .....		510,000
<b>ORANGE COUNTY</b>			
US 101 (Interstate 5)	Widen Santa Ana Freeway to 6 lanes and install median barrier between State Highway Route 185 (Laguna Canyon Road) and Browning Avenue, about 5 miles north of Irvine .....	5.5	1,290,000
US 101 (Interstate 5)	Widen Santa Ana Freeway to 6 lanes between Browning Avenue, 5 miles north of Irvine, and 0.1 mile south of Santiago Creek, and construct ramps and frontage road at Newport Boulevard in Tustin .....	4.8	1,550,000
SSR 55, US 101	Tree planting on Newport Freeway between 0.5 mile south of Santa Ana Freeway and 0.7 mile northeast of US 91, and on Santa Ana Freeway between 0.5 mile southeast and 0.5 mile northwest of Newport Freeway .....		35,000
US 101 Alt.	Widen Pacific Coast Highway to 4 lanes divided and modify traffic signals between 0.2 mile north of Vista Del Sol in South Laguna and south city limit of Laguna Beach .....	3.2	205,000
Interstate 405	8-lane San Diego Freeway between Newland Street and 0.6 mile east of Bolsa Chica Road in Westminster and Huntington Beach .....	4.3	8,900,000
SSR 35 (Interstate 605)	8-lane San Gabriel River Freeway between San Diego Freeway and 0.3 mile north of Katella Avenue near Los Angeles county line .....	2.4	5,500,000
SSR 14	Interchange at Dowling Avenue in Anaheim to convert Riverside Freeway to full freeway .....		930,000
SHR 176	Widen at intersections and install traffic signals and highway lighting on Imperial Highway between 0.2 mile west of Puente Avenue in Fullerton and 0.2 mile east of Arovista Avenue in Brea. (Fullerton's share, \$7,500; Brea's share, \$6,000) .....	9.6	35,000
SSR 22	6-lane Garden Grove Freeway between Garden Grove Boulevard near Hester Street in Garden Grove and Placentia Avenue in Orange .....	1.1	1,400,000 (State's share)
<b>RIVERSIDE COUNTY</b>			
US 60	4-lane freeway extension between Kitching Street east of Sunnymead and State Sign Route 79 northeast of Moreno .....	6.8	2,705,000
US 60, 70, 99 (Interstate 10)	Install signs and highway lighting at the intersections of US 60-70-99 and SSR 111 west of Whitewater, and intersection of US 60-70-99 and Indian Avenue in Garnet .....		90,000
SSR 111			
US 395	Landscape onramp between "G" and "D" Streets in Perris .....	0.5	15,000
US 395, SSR 74	Planting, including trees, between Watson Road, north of Romoland, and "G" Street in Perris .....		10,000
SSR 111	Widen from 2 to 4 lanes between Cathedral City and State Sign Route 74 at Palm Desert .....	6.6	1,000,000
SSR 111	Widen to 4 lanes between Indian Trail in Palm Springs and Cathedral City .....	4.7	525,000
SHR 187	4-lane expressway through Dry Morongo Canyon 7.0 miles northeast of Whitewater .....	4.1	1,900,000
SHR 193	Widen Hammer Avenue to 4 lanes between US 91 in Corona and 0.3 mile south of Santa Ana River near Norco .....	4.2	300,000
US 70-99 (Interstate 10)	Convert 4-lane expressway to 6-lane freeway between Beaumont and Redlands .....	11.7	7,200,000
US 60-70 (Interstate 10)	4-lane freeway between 3.5 miles east of US 99 east of Indio and 9.7 miles west of Cottonwood Springs Road near the intersection with State Sign Route 195 .....	10.0	3,500,000
SSR 111	Widen to 4 lanes between Deep Canyon Road in Palm Desert and 1.3 miles westerly .....	1.3	250,000
Various	Rights-of-way .....		3,025,000
<b>SACRAMENTO COUNTY</b>			
US 50-99	Landscaping and planting, including trees, on South Sacramento Freeway between Sacramento Boulevard and Stevenson Avenue .....	4.9	315,000
US 40 (Interstate 80)	Superstructure and freeway approaches for Sacramento River Bridge between Sacramento Northern Railroad in Yolo County and Fifth Street in Sacramento. (Substructure finance in the 1962-63 budget) .....	1.2	11,000,000
Various	Rights-of-way (including \$6,450,000 for US 40 Freeway between West Sacramento and 34th Street in Sacramento) .....		10,000,000
<b>SAN BENITO COUNTY</b>			
SSR 156	Tree planting on portions between 0.3 mile west of west city limit of San Juan Bautista and 0.3 mile west of San Benito River .....		3,000
Various	Rights-of-way .....		115,000
<b>SAN BERNARDINO COUNTY</b>			
SHR 187	4-lane expressway through Dry Morongo Canyon 7.0 miles northeast of Whitewater .....	4.1	1,900,000
US 66	Channelization between Etiwanda Avenue west of Fontana and Macy Street in San Bernardino .....	10.4	60,000
US 70-99 (Interstate 10)	Planting, including trees, between US 91-395 in Colton and Colton Avenue in Redlands .....		30,000
US 70-99 (Interstate 10)	Convert 4-lane expressway to 6-lane freeway between Beaumont and Redlands .....	11.7	7,200,000
US 70-99 (Interstate 10) US 91-395 (Interstate 15)	New connection between US 91-395 (Interstate 15) westbound to San Bernardino Freeway (US 70-99, Interstate 10) in Colton in San Bernardino .....	1.4	580,000

Route	Description	Approx. mileage	Estimated cost
<b>SAN BERNARDINO COUNTY—Continued</b>			
US 66-91-395 (Interstate 15)	Planting, including trees, between 27th Street in San Bernardino and 1.4 miles north of Devore		\$35,000
US 395-66-91 (Interstate 15)	Widen San Bernardino Freeway to 6 lanes between Riverside Freeway in Colton and Third Street in San Bernardino, and widen shoulders from Third Street to Base Line Street	3.9	350,000
SSR 18	Convert 2-lane highway and expressway to 4-lane expressway between 44th Street in City of San Bernardino and 1 mile north of city limit	1.8	275,000
SSR 18	Interchange between State Highway Route 188 and SSR 18 near Crestline	1.0	1,000,000
SHR 188			
US 66 (Interstate 40)	4-lane freeway between 1.0 mile east of US 91 in Brastow and 2.5 miles east of Daggett	9.0	5,200,000
US 66-95	Widen shoulders and resurface between Needles and 26 miles west	26.3	250,000
US 66-95 (Interstate 40)	Construct underpass and approaches at the Atchison, Topeka and Santa Fe Railway tracks in Needles	1.4	1,450,000
SHR 207	Widen City Creek Highway to 4 lanes between 1.5 and 2.5 miles southwest of Running Springs	1.0	285,000
Various	Rights-of-way (including \$1,300,000 on US 66 (Interstate 40) between Barstow and Colorado River)		3,980,000
<b>SAN DIEGO COUNTY</b>			
US 101 (Interstate 5)	8-lane freeway between Eighth Street in National City and south city limit	1.6	2,400,000
US 101 (Interstate 5)	Landscaping between Sixth Avenue and Palm Street in San Diego	1.2	180,000
US 101 (Interstate 5)	6-lane freeway between Maple and Washington Streets in San Diego	1.6	3,300,000
US 101 (Interstate 5)	8-lane freeway between Via de la Valle near Del Mar and San Marcos Road north of Encinitas	5.1	4,900,000
US 101 (Interstate 5)	Revise signing between Leucadia and Camp Pendleton Road	13.0	55,000
US 101 (Interstate 5)	Widen existing highway to 4 lanes divided between Border Avenue north of Del Mar Race Track and 0.2 mile north of Cardiff Beach State Park	2.0	160,000
US 80 (Interstate 5)	Tree planting from Taylor Street in San Diego to west city limit of El Cajon and landscaping from west city limit to East Main Street in El Cajon		240,000
US 80 (Interstate 5)	4-lane freeway from East Main Street in El Cajon easterly to Harritt Road	4.0	3,300,000
US 395	Convert 2-lane expressway to 4-lane freeway between two miles north of Miramar Road and 0.8 mile north of Poway Road in San Diego	2.7	3,100,000
US 395	Widen to 4-lane expressway between 1.3 miles north of Lake Hodges Bridge and 0.3 mile north of 17th Avenue in Escondido	2.0	400,000
SSR 78	Tree planting between 1 mile west of Vista and Nordahl Road near Escondido		30,000
SSR 78	4-lane freeway between 2.7 miles east of San Marcos and US 395 in Escondido	1.8	2,100,000
SSR 67	Structures at Prospect Avenue and Woodside Avenue in and near Santee for future 4-lane freeway	1.1	250,000
SSR 94	Widen between Campo and 0.6 mile west	0.6	170,000
Various	Rights-of-way (including \$4,800,000 on US 101 in and north of San Diego; \$3,000,000 on Route 241 (Inland) Freeway in San Diego area; and \$1,900,000 on SSR 94 east of La Mesa)		13,254,500
<b>SAN FRANCISCO COUNTY</b>			
SHR 239 (Interstate 280) US 101, SSR 1	8- and 10-lane Junipero Serra Freeway between 0.4 mile south of Eastmoor Avenue in Daly City and just south of Alemany Boulevard in San Francisco; 6-lane Southern Freeway between Junipero Serra Freeway and 0.3 mile east of Orizaba Avenue in San Francisco; grade and construct frontage road and drainage structures for future freeway on SSR 1 between St. Francis Boulevard in Daly City and Junipero Serra Freeway	3.9	10,100,000
US 101	Landscape Southern Freeway between near Mission Street and James Lick Memorial Freeway Interchange	1.1	110,000
SHR 224 (Interstate 480)	Construct ramp connections between Embarcadero Freeway and Clay and Washington Streets	0.4	1,350,000
Various	Rights-of-way (including \$2,300,000 for Southern Freeway-Embarcadero Freeway Extension)		2,600,000
<b>SAN JOAQUIN COUNTY</b>			
US 50	Resurface between Kasson Road northeast of junction with SSR 33 and San Joaquin River	3.3	70,000
SSR 120	Widen shoulders between US 50 and 0.3 mile east of west city limit of Manteca	3.9	100,000
SSR 120	Widen to 40-foot city street section for 1.2 miles through Escalon and construct channelization. (City's share, \$12,000)	1.2	75,000
Various	Rights-of-way		(State's share) 2,150,000
<b>SAN LUIS OBISPO COUNTY</b>			
US 101	4-lane freeway between 0.9 mile north of San Miguel and Monterey county line	2.3	1,330,000
US 101	Reconstruct and resurface portions of 4-lane expressway between Atascadero and Paso Robles	9.0	385,000
SSR 1	4-lane freeway between Old Creek south of Cayucos and 1.2 miles north of Cayucos Creek	2.8	3,050,000
SHR 125	Reconstruct between Salinas River Bridge near Atascadero and 0.1 mile west of Huer Huevo Creek	9.7	140,000
US 101	Tree planting between 4 miles south of Santa Maria and Hourihan Grade in San Luis Obispo County		20,000
Various	Rights-of-way		930,000
<b>SAN MATEO COUNTY</b>			
SSR 1	Construct Gateway Drive undercrossing and approaches in Daly City		270,000
US 101 (Bypass)	Level and resurface portions of Bayshore Freeway between Whipple Avenue Overcrossing in Redwood City and Fifth Avenue in San Mateo		850,000
SHR 105	Landscape 19th Avenue Freeway between 0.6 mile north of West Hillsdale Boulevard Extension and South Delaware Street in San Mateo	1.8	225,000
SHR 214	4-lane expressway between Cypress Street in Redwood City and Bayshore Freeway and an interchange at Five Points with El Camino Real (US 101). (City's share, \$1,000,000)	1.3	1,250,000
SHR 239 (Interstate 280)	Junipero Serra Freeway bridge over Stanford Linear Accelerator 1.2 miles southeast of Woodside		(State's share) 500,000
SHR 239 (Interstate 280), US 101, SSR 1	8- and 10-lane Junipero Serra Freeway between 0.4 mile south of Eastmoor Avenue in Daly City and just south of Alemany Boulevard in San Francisco; 6-lane Southern Freeway between Junipero Serra Freeway and 0.3 mile east of Orizaba Avenue in San Francisco; grade and construct frontage road and drainage structures for future freeway on SSR 1 between St. Francis Boulevard in Daly City and Junipero Serra Freeway	3.9	10,100,000
Various	Rights-of-way (including \$6,700,000 for Junipero Serra Freeway)		10,605,000



Route	Description	Approx. mileage	Estimated cost
<b>SANTA BARBARA COUNTY</b>			
US 101	Planting, including trees, between El Sueno Road north of Santa Barbara and Elwood.....	8.0	\$150,000
US 101	4-lane freeway bypass of Buellton between 0.7 mile south of Santa Ynez River and 0.7 mile north of Buellton.....	1.8	3,250,000
US 101	Tree planting between 4.0 miles south of Santa Maria and Hourihan Grade in San Luis Obispo County.....		20,000
SSR 150	Reconstruct and realign highway between 1.4 and 2.8 miles west of Buellton.....	1.4	150,000
Various	Rights-of-way.....		1,930,000
<b>SANTA CLARA COUNTY</b>			
US 101	Resurface between Llagas Creek Bridge and El Toro Avenue in Morgan Hill.....	3.6	200,000
SSR 17	Widen, resurface and channelize at Summit Road (SSR 5) Intersection at Santa Clara-Santa Cruz county line.....	0.3	55,000
SSR 152	Widen shoulders and resurface between 2.9 miles west and 2.9 miles east of Bells Station (east of Gilroy).....	5.9	350,000
US 101	Planting, including trees, between Agnew Road in Sunnyvale and 2 miles southerly.....	2.0	100,000
SSR 114	4-lane Stevens Creek Freeway between 0.1 mile south of Homestead Road in Cupertino and US 101 Bypass (Bayshore Freeway) in Mountain View. (Santa Clara County's share, \$40,000).....	5.5	6,560,000 (State's share)
SHR 239 (Interstate 280)	6-lane Junipero Serra Freeway between 0.6 mile east of Saratoga Avenue in San Jose and Saratoga-Sunnyvale Road (SSR 9) in Cupertino, and grading for future freeway construction between Saratoga-Sunnyvale Road and Stelling Road in Cupertino. (Santa Clara County Flood Control and Water Conservation District's share, \$135,000).....	4.6	4,465,000 (State's share)
FAS 992	Widen Leavesley Road from 2 to divided 4 lanes between Monterey Road and the east city limit of Gilroy, and install traffic signals and automatic warning signals at railroad crossing. (Urban extension of federal aid secondary county road. Gilroy's share, \$100,000).....	0.5	100,000 (State's share)
FAS 995	Widen Saratoga Avenue to divided 4-lanes between Stevens Creek Road and Scott Boulevard-Newhall Street in Santa Clara, and construct bridge across San Tomas Creek. (Urban extension of FAS county road. City of Santa Clara's share, \$176,300; Santa Clara County's share, \$54,700).....	1.3	231,000 (State's share)
FAS 1015	Two lanes of ultimate divided 4-lane Capitol Expressway between Senter and Tuers Roads in San Jose, and construct bridge across Coyote Creek. (Urban extension of FAS county road. San Jose's share, \$90,500; Santa Clara County's share, \$90,500).....	0.5	181,000 (State's share)
SSR 152	4-lane expressway between 1 mile west of Merced county line in Santa Clara County and 1.8 miles west of State Sign Route 33. (Relocation around San Luis Reservoir which will inundate the existing highway.) The Department of Water Resources has reserved \$11,500,000 toward this project.....	12.4	5,000,000 (State's share)
Various	Rights-of-way (including \$2,800,000 for Junipero Serra Freeway).....		5,140,000
<b>SANTA CRUZ COUNTY</b>			
SSR 1, SHR 67	Grade and structures for future freeway on portions of SSR 1 between Monterey county line and 1.5 miles northwest of Buena Vista Drive near Watsonville; grade portion for 4-lane highway on SHR 67 between SSR 1 and east of Main Street in Watsonville.....	3.8	2,100,000
SSR 17	Widen, resurface and channelize at Summit Road (SSR 5) Intersection at Santa Clara-Santa Cruz county line.....	0.3	55,000
Various	Rights-of-way.....		120,000
<b>SHASTA COUNTY</b>			
US 99 (Interstate 5) SSR 44	Grade and structures for future 4-lane Redding Freeway on US 99 between Riverside Avenue north of Anderson and 2 miles north of Redding; 4-lane freeway on SSR 44 between Market Street in Redding and Hilltop Road east of the city.....	14.1	7,700,000
SSR 44	2-lane expressway between Airport Road and Cow Creek east of Redding.....	4.5	950,000
Various	Rights-of-way.....		880,000
<b>SIERRA COUNTY</b>			
SSR 49	Replace bridge across North Yuba River on new alignment and construct approaches.....	0.4	355,000
SSR 49	Widen portions between Bassetts and Yuba Pass.....		100,000
Various	Rights-of-way.....		10,000
<b>SISKIYOU COUNTY</b>			
US 99 (Interstate 5) Various	4-lane Mount Shasta Freeway between 4.5 miles south and 1.5 miles north of city.....	6.5	4,800,000
	Rights-of-way.....		100,000
<b>SOLANO COUNTY</b>			
US 40 (Interstate 80)	Truck shelter and tool house at Cordelia Scale and Brake Inspection Station.....		155,000
US 40 (Interstate 80)	Convert 4-lane expressway to 6-lane freeway between 0.2 mile north of Travis Boulevard and 1.0 mile southwest of Vacaville.....	7.0	5,300,000
SSR 12	Replace Happe Drain Bridge 1.6 miles northwest of Rio Vista and construct approaches.....	0.3	80,000
Interstate 680	Planting, including trees, between Laurel Street near Vallejo and Benicia-Martinez Bridge.....	7.0	150,000
SSR 48	Reconstruct approach spans of Sonoma Creek Bridge.....		775,000
Various	Rights-of-way.....		420,000
<b>SONOMA COUNTY</b>			
US 101	4-lane freeway between 1.7 miles north of Canyon Road south of Cloverdale and 0.8 mile south of Washington School Road (Zanzi's Corner).....	1.6	1,200,000
SSR 1	Install underdrains on portions between Bodega Bay and SSR 12 at Jenner.....		65,000
SSR 12	Replace timber-steel retaining wall with concrete viaduct 1.6 miles west of Guerneville.....	0.3	200,000
SSR 48	Reconstruct approach spans of Sonoma Creek Bridge.....		775,000
Various	Rights-of-way.....		525,000
<b>STANISLAUS COUNTY</b>			
US 99	Pave 6-lane freeway between Ceres and 2.4 miles north of Modesto.....	7.0	4,150,000
Various	Rights-of-way.....		1,150,000
<b>SUTTER COUNTY</b>			
US 99E	Widen to 4 lanes between Queens Avenue at north city limit of Yuba City and 0.8 mile north, and widen additional 0.8 mile section of existing 2-lane highway to 0.3 mile north of Pease Road.....	1.6	335,000
SHR 245	Widen Garden Highway and Tudor Road between 0.2 mile north of Sacramento Avenue (1.6 miles northwest of Nicolaus) and US 40 Alternate.....	7.2	200,000
Various	Rights-of-way.....		100,000

Route	Description	Approx. mileage	Estimated cost
<b>TEHAMA COUNTY</b>			
US 99E	Channelize and improve intersections on portions between SSR 36 east of Red Bluff and Samson Slough.....	1.8	\$140,000
US 99W (Interstate 5)	Structures and approaches for future Red Bluff Freeway between existing US 99W immediately south of Red Bluff and 0.2 mile north of Adobe Road.....	3.0	3,160,000
Various	Rights-of-way.....		300,000
<b>TRINITY COUNTY</b>			
US 299	2-lane expressway between 5.6 and 8 miles east of Douglas City.....	2.1	1,695,000
<b>TULARE COUNTY</b>			
US 99	Planting, including trees, on portions between 1 mile south of Sherwood Avenue in McFarland and Kings River in Tulare County.....		125,000
SSR 198	4-lane freeway between 0.3 mile west of Woodland Drive west of Visalia and Second Avenue east of Visalia; grade and structures for future 4-lane freeway and expressway between Second Avenue and 0.3 mile east of SSR 65 North.....	11.9	4,390,000
SHR 131	Replace Kings River Bridge on Road 400 and construct approaches and remove overflow bridge east of Kingsburg.....	0.9	290,000
SSR 63	Grade and pave 1-way couplet or Court-Northwest Third and Locust-Northwest Second Streets between SSR 198 in Visalia and 0.1 mile north of Houston Avenue.....	1.2	115,000
Various	Rights-of-way.....		576,000
<b>TUOLUMNE COUNTY</b>			
Various	Rights-of-way.....		350,000
<b>VENTURA COUNTY</b>			
US 101	Convert Ventura Freeway to full freeway between 0.5 mile west of Triunfo Road east of Thousand Oaks and 0.5 mile east of Moorpark Road.....	2.6	675,000
US 101	Convert Ventura Freeway to full freeway between 0.5 mile west of Moorpark Road and 0.4 mile west of Borchard Road.....	2.1	750,000
US 101	Interchange between Ventura Freeway and Old Conejo Road.....	0.6	470,000
US 101, US 399	Landscape Ventura Freeway between California Street in Ventura and Ventura River, and Ojai Freeway between Ventura Freeway and Prospect Street just north of city.....	1.4	250,000
US 101	Resurface portions between 0.2 mile north of Ventura and 1 mile north of Seaciff.....		135,000
SSR 118	Widen intersections between Los Angeles Avenue-Moorpark Road (SSR 23) at Moorpark and Los Angeles county line.....		100,000
SSR 136	4-lane freeway between 0.1 mile west of Wells Road and 0.7 mile east of Santa Paula.....	6.5	7,200,000
US 399	Tree planting on Ojai Freeway between Prospect Street and 0.3 mile south of Mills School just north of Ventura.....		3,000
FAS 1164 (Urban Extension)	Two lanes of ultimate divided 4-lane roadway on Harbor Boulevard between Channel Drive and East Main Street (US 101) in Ventura, and constructing overhead across Southern Pacific Railroad tracks and installing traffic signals. (Urban extension of FAS county road. City of Ventura's share, \$112,500)	0.7	112,500 (State's share)
Various	Rights-of-way.....		2,955,000
<b>YOLO COUNTY</b>			
US 40 (Interstate 80)	Superstructure and freeway approaches for Sacramento River Bridge between Sacramento Northern Railroad in Yolo County and Fifth Street in Sacramento. (Substructure financed in the 1962-63 budget).....	1.2	11,000,000
Various	Rights-of-way.....		50,000
<b>YUBA COUNTY</b>			
SSR 20	Widen to 4 lanes between US 40 Alternate and Yuba Street in Marysville and construct underpass at the Southern Pacific Railroad tracks.....	0.2	585,000
Various	Rights-of-way.....		130,000



# STATE OF CALIFORNIA

EDMUND G. BROWN, Governor

## HIGHWAY TRANSPORTATION AGENCY

ROBERT B. BRADFORD . . . Administrator

### DEPARTMENT OF PUBLIC WORKS . . . ROBERT B. BRADFORD, Director

RUSSELL J. COONEY . . . Deputy Director (Management)  
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T. F. BAGSHAW . . . Assistant Director  
JOHN H. STANFORD . . . Assistant Director

JUSTIN DuCRAY . . . Departmental Management Analyst  
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### DIVISION OF HIGHWAYS

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