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California Highways and Public Works

Official Journal of the Division of Highways,
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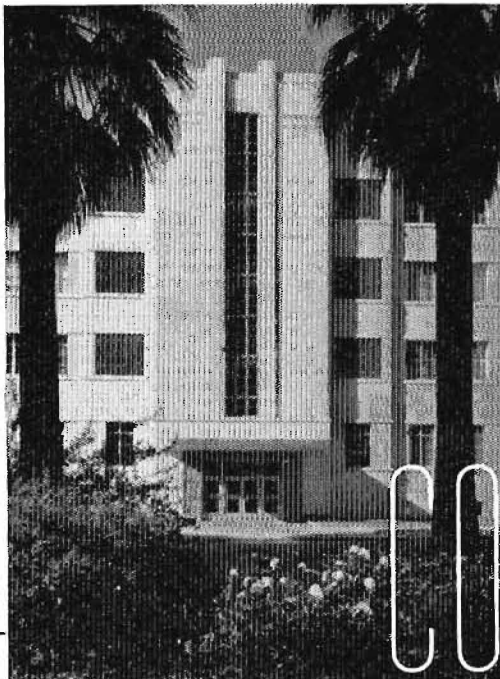
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Nine Years

*Nine Miles and Nine Million
Dollars Make Bayshore Freeway*

By E. J. CARTER, Assistant District Construction Engineer, District IV

THE CALIFORNIA Highway Commission on December 30, 1939, authorized necessary surveys for improving the Bayshore Highway south of San Francisco as a "divided road."

This action launched a campaign that, nine years and \$9,000,000 later, has resulted in completion of a nine-mile section of six-lane divided Bayshore Freeway between South San Francisco and San Mateo.

Twelve contracts have been required to bring this section to its present state. Briefly, they have been as follows: One contract for grading and constructing sand drains; three grading and paving contracts; one complete structure, two substructure and two superstructure contracts; one armor coat shoulder contract and two landscaping contracts.

Attractive Structures

In order to best describe the completed portion of the freeway, we shall view it as seen by a motorist as he travels north along the existing four-lane undivided highway toward San Francisco.

In San Mateo, some 35 miles from the beginning of Route 68 south of San Jose, the motorist approaches the start

Director of Public Works C. H. Purcell on May 11th awarded to Guy F. Atkinson Company and Chas. L. Harney, Inc., San Francisco, a contract for \$2,819,378.90 for an additional unit of the Bayshore Freeway in San Francisco.

The contract calls for grading, surfacing, overhead structures and the installation of traffic signal and highway lighting systems between Augusta Street and 25th Street in the City of San Francisco.

of the improved section; a block north is the Peninsular Avenue overpass, a gracefully curving bridge spanning the roadway on single column piers.

Entering now upon the full six-lane divided freeway, he notes the outer highway that serves Burlingame on the left, as he speeds toward another curved separation structure two miles ahead at Broadway, Burlingame. Passing beneath this structure he can see ahead to the Millbrae overcrossing with the two San Francisco Airport overcrossings curving toward each other in the distance.

As he drives beneath the airport overcrossing on a sweeping 4,000-foot radius curve to the right, the motorist now approaches what is perhaps the most interesting interchange of the trip—the San Bruno overcrossing. At this interchange the cross traffic is carried above the freeway on an overcrossing and all turning movements are made at grade. The left turns are made by means of a full cloverleaf which is completely enclosed by a diamond pattern designed to accommodate all right-turn movements.

Seven Bridges

After leaving the San Bruno overcrossing the motorist enters the city of South San Francisco and approaches Colma Creek and the South San Francisco Belt Railway, where seven separate bridges are required to provide creek crossings and grade separations.

Just beyond are the twin bridges that carry mainline traffic above Grand Avenue and seven Southern Pacific Railroad Company tracks. A pedestrian overpass at California Avenue and the vehicular overcrossing at Butler Avenue complete the separation

Pedestrian overpass in South San Francisco, showing 120-foot clear span across new Bayshore Freeway





Broadway overcrossing in Burlingame looking north. Old Bayshore Highway is on right



Butler Road overcrossing in South San Francisco. Pedestrian overcrossing in central section and Grand Avenue overcrossing in background

structures. About 1,700 feet north of Butler Avenue the freeway curves to the left to a temporary connection again with the old four-lane undivided Route 68. In the future this connection will be eliminated and the freeway will be continued through Sierra Point and across the open water of San Francisco Bay to its ultimate connection with present and future east bay bridges.

Accidents Reduced

Prior to construction of the grade separation at Grand Avenue, the local traffic from the South San Francisco industrial area was forced to compete with peak-hour train and vehicular traffic in crossing the old Bayshore. The delay was added to by the fact that intersection signals were of necessity set to favor the Bayshore traffic. The delay was often as much as forty-five minutes, and at quitting time in the industrial area the intersection was badly congested for as much as an hour and a quarter. The twin bridges now carry express freeway traffic above the

local traffic, thus permitting normal signal operation on Grand Avenue, which has resulted in the elimination of undue delay.

The efficacy of the freeway design with grade separations at all cross-overs is attested to by the fact that since this section was opened to traffic the reported accidents have been reduced by 75 percent. In addition, it is estimated that the driving time from State Street in San Mateo to the temporary conform north of Butler Avenue in South San Francisco has been reduced by as much as twenty minutes during peak-hour periods.

Less Traveling Time

The decrease in traveling time is extremely significant when compared with the increase in traffic. In 1940, at the Broadway, Burlingame, traffic count station the average 24-hour traffic was 21,200 vehicles and in 1948 it was 29,700. This is an increase of 8,500 or 40 percent. The predicted traffic in 1970 is estimated at 47,300 vehicles—

an increase of 126 percent over the 1940 total.

In general, the freeway consists of three 12-foot traffic lanes on either side of a 36-foot dividing strip.

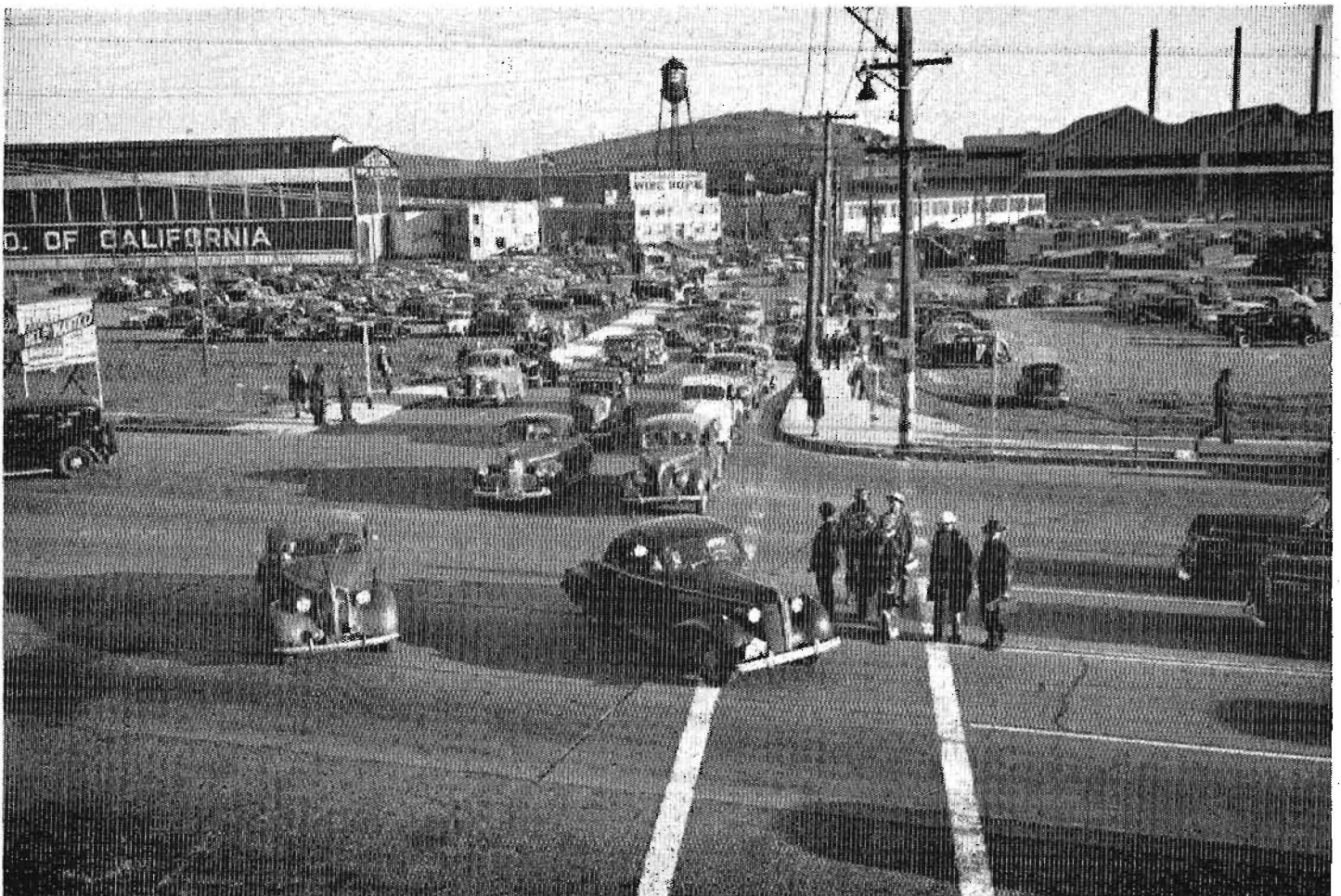
The structural details of the traveled way vary as follows: 2.2 miles, Broadway to State Street, eight inches of portland cement concrete pavement on four inches of crusher run base and one foot minimum imported borrow; 5.2 miles, Colma Creek to Broadway, four inches of asphalt concrete on eight inches of crusher run base and two feet minimum imported borrow; 2.1 miles, South San Francisco to Colma Creek, eight inches of portland cement concrete pavement on four inches of crusher run base and eight inches minimum imported borrow.

Most Recent Project

Contract 04TC42-F, completed in May, is the most recent major contract on this section of the Bayshore

... Continued on page 58

This photo shows traffic congestion which existed on old Bayshore Highway at Butler Road in South San Francisco





Looking north on the new Bayshore Freeway toward Sierra Point. Hunter's Point in distance

Rapid Progress

East Shore Freeway Project in
Oakland Nearing Completion

By E. J. CARTER, Assistant District Construction Engineer, District IV

"**F**REEWAY" means a street or a highway in respect to which the owners of abutting lands have no right or easement of access to or from their abutting lands or in respect to which such owners have only limited or restricted right or easement of access (Chapter 359, Statutes of 1939).

The foregoing is a laconic legal description and does not give an actual picture of a freeway. Missing is a delineation of the safety and convenience inherent in the modern highway structure. By the limiting of access to certain well defined and justifiable locations, removing cross traffic by means of grade separations, eliminating cross-traffic turning movements by means of interchanges, carrying local traffic on parallel service roads and by separating large volumes of opposing traffic, the freeway stands foremost in today's highway picture.

With California economic and social life geared as it is to the extensive use of the automobile, movement of large masses of motorists through metropolitan areas presents the most difficult aspect of present day highway construction. This is especially true when the crossing and intermingling of local traffic is considered.

First Freeway Resolution

Envisioning the East Shore Freeway as an artery of rapid transit between the Carquinez Bridge to the north, through the City of Oakland and on to San Jose to the south, with direct connections to San Francisco Bay crossings, the Highway Commission, in one of the first freeway resolutions adopted after passage of the freeway law, designated as a freeway the route between the approaches to the San Francisco-Oakland Bay Bridge, in the City of Emeryville, and the point of intersection with Route 14 in El Cerrito, in Contra Costa County.

Continued study of the problems involved made necessary various modifications and additions to the original resolution. With the advent of World War II, construction plans were necessarily suspended. This did not interrupt future planning, however, and this route emerged as a prime postwar project. Studies were continued and agreements were entered into with the 12 cities and two counties through which the freeway extends. Today the agreements cover freeway construction from the south bridgehead of the Carquinez Bridge to Beard Road in Al-

varado near the Santa Clara County line, a distance of approximately thirty-six miles.

Rapid Progress

Construction to date on the East Shore Freeway has been within the 6.9 mile section from the south city limits of Oakland to Sixth and Oak Streets.

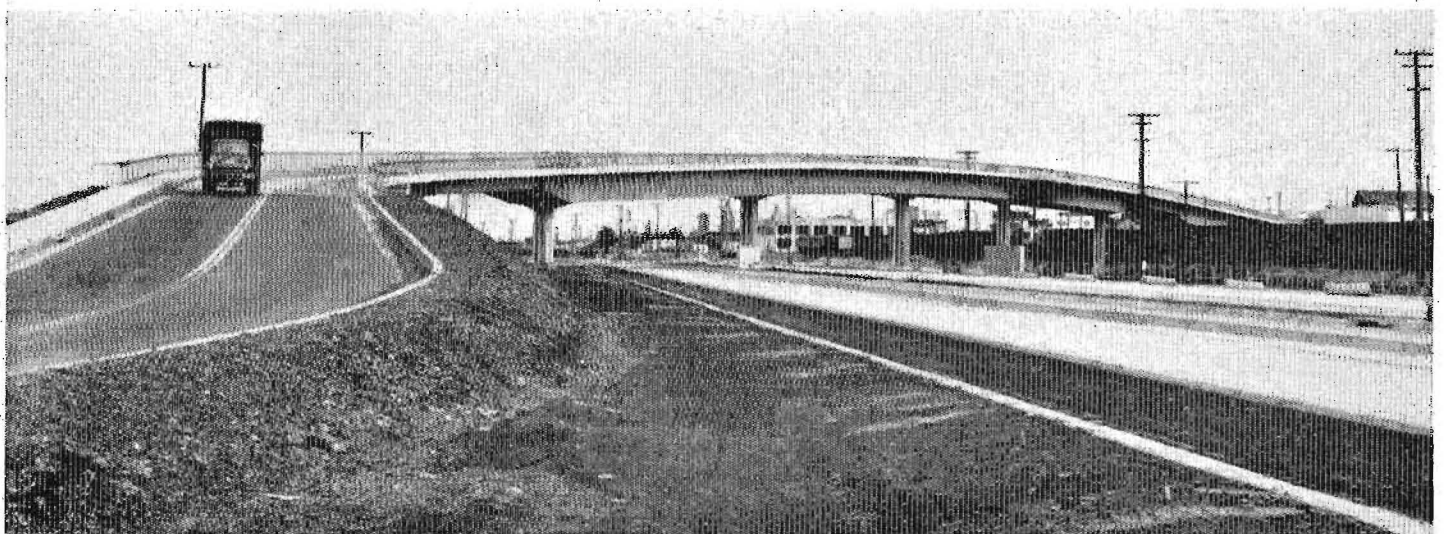
Progress currently being made indicates that this section of the freeway will be completed early this summer. It is expected that the entire 6.9 mile section, with the exception of the San Leandro Creek Bridge at the southerly end, will be completed in the spring of 1950.

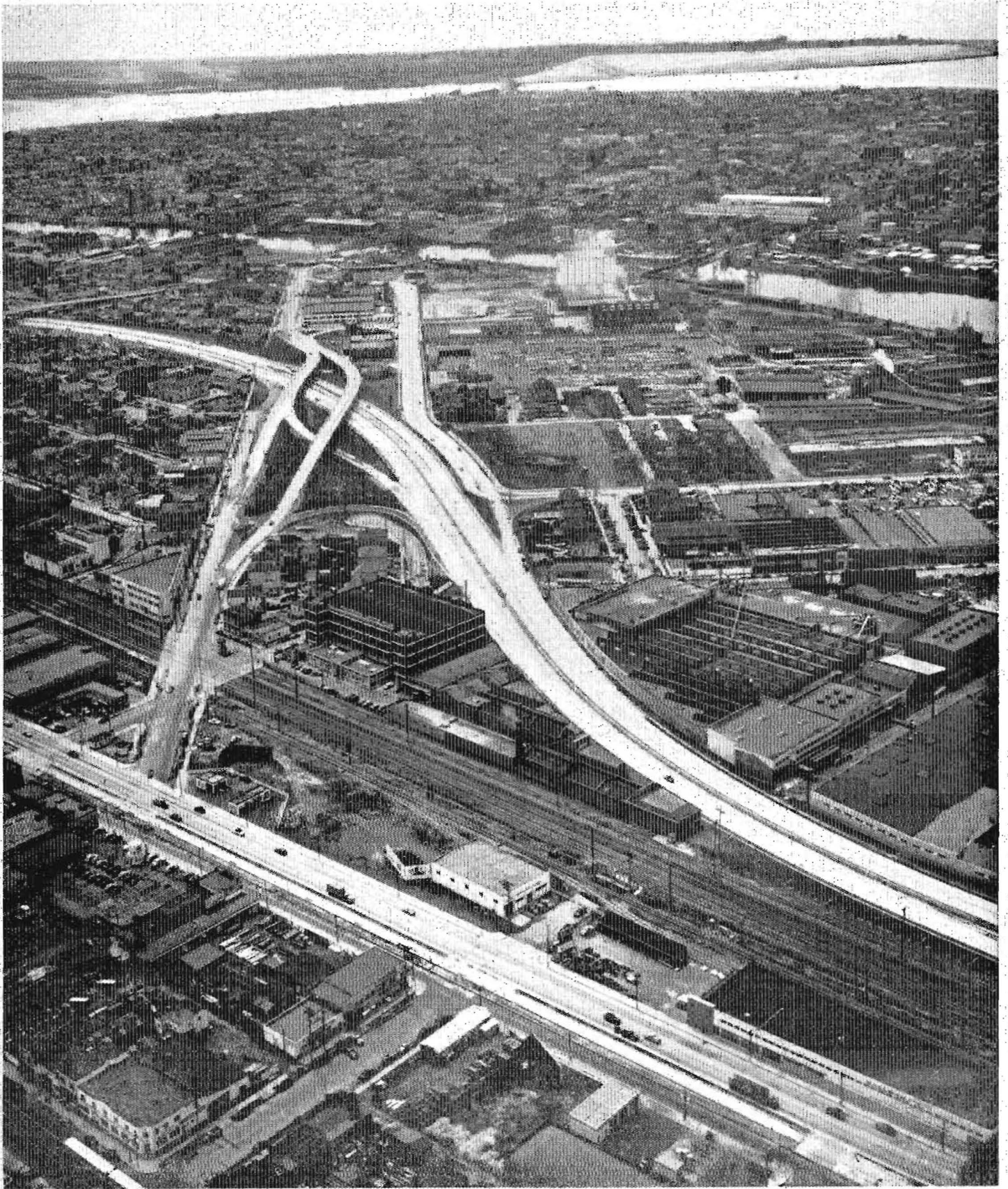
The Bridge Department has completed nine bridges and five overcrossings and now has four overcrossings, two bridge ramps and two underpasses under contract with one remaining bridge that will probably be let out for contract next year.

The district has completed one grading-paving contract, one dredging contract, and a second grading contract is now nearing completion. A third contract, for paving the dredger fill section and constructing separation structures, has recently been awarded.

The present estimates of costs indicate that this 6.9 mile section when completed will have cost, including right of way and engineering, in excess of \$17,000,000; about \$2,500,000 per mile.

This is the 19th Avenue Overhead on the Eastshore Freeway





Aerial View of Eastshore Freeway looking south, showing 23d Avenue Overhead and Kennedy Street approach

Project Nearing Completion

Contract 0-4TC48-F was awarded on April 1, 1948, to the Fredrickson & Watson Construction Company for grading and paving the three-mile section from 38th Street to Sixth and Oak Streets, all in the City of Oakland.

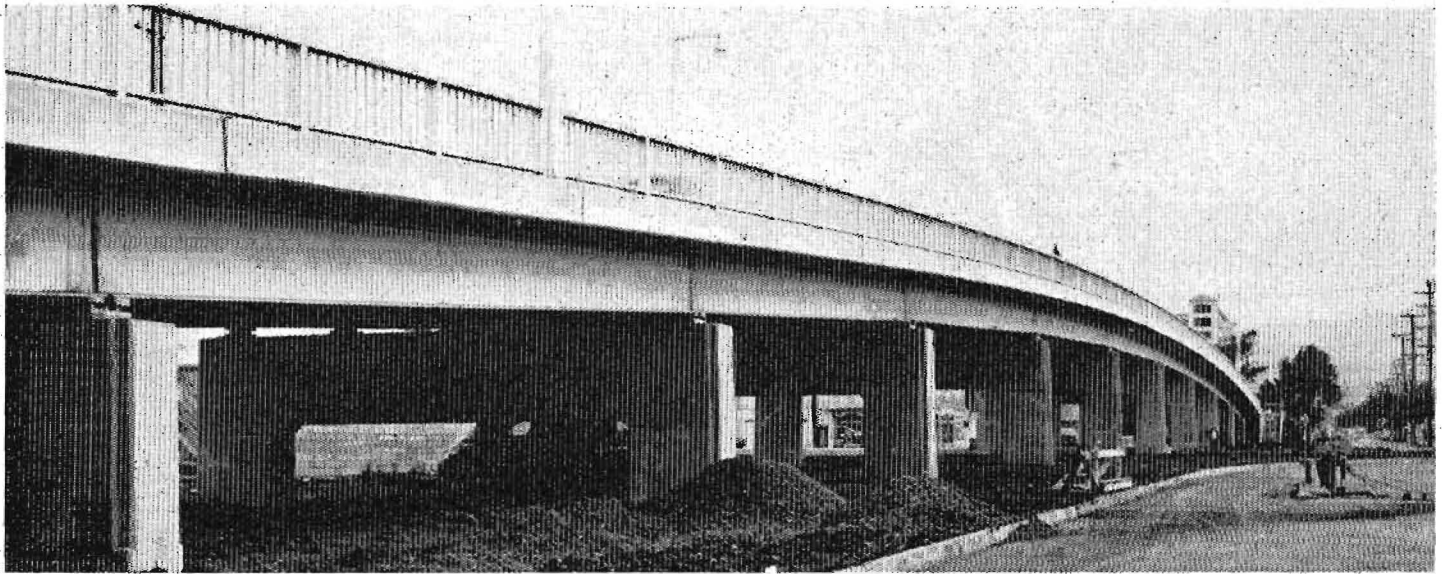
Skirting the salt water estuary, the project traverses industrial and heavily populated residential areas. The potential for the entire area is heavy industrial.

Fruitvale Avenue a single structure with division strip provides a separation of both the local traffic and the Southern Pacific Railroad. The 19th Avenue Overcrossing carries the local traffic over the freeway and the tracks of the Southern Pacific and Western Pacific Railroads. At 23d Avenue and 29th Avenue, overcrossings carry the local traffic above the freeway, and at Fifth Avenue a 2,554-foot long overcrossing with division strip spans the mainline tracks of the Southern Pacific

Relocation of Buildings

The north end of the project runs through a federal housing project, built upon state right of way leased to the Housing Authority during the war years. There were 12 two-story buildings housing 96 families within the right of way limits. Because of the existing dwelling shortage, only those buildings directly in the way of construction were demolished. A portion of these buildings temporarily remain upon the right of way in locations that

Closeup of 29th Avenue Overhead on Eastshore Freeway



The terrain is flat, sloping generally in a southerly direction toward the estuary. The maximum grade throughout the project is the 3.94 percent on the approach to the Fruitvale overcrossing. The alignment is gently curving, with 10 curves ranging in radius from 1,000 feet to 10,000 feet.

Although this section of the freeway roughly parallels the present Route 69 through the City of Alameda, it bears but little relation to the existing route, either physically or functionally. Upon completion of the freeway the existing route will serve as an important city street insofar as local traffic is concerned.

Five Major Structures

Five of the major structures now constructed on the freeway lie within the limits of Contract 0-4TC48-F. At

Railroad, the Western Pacific Railroad and the Lake Merritt Canal.

In all, 10 railroad grade crossings have been eliminated in this section.

In addition to vehicular separations, a heavy pedestrian movement between the existing residential areas west of the freeway and the shopping districts located on the east necessitated the construction of a pedestrian undercrossing in the vicinity of Livingston Avenue.

Before construction could start on this project it was necessary to remove about one hundred seventy-five residences, housing some three hundred forty persons. The district succeeded in preserving approximately two-thirds of this housing by relocating buildings, and it was necessary to demolish the remaining one-third.

do not interfere with the construction or use of the freeway. These remaining two-story units will probably stay until the housing situation permits reestablishment of the tenants in other housing.

In addition to the private residences, it was necessary to relocate some twenty-two various heavy or medium heavy industries. Among them the California Cotton Mills, National Automotive Fibers, California Wire Cloth, Marguart's Machine Shop, E. K. Wood Lumber Co., and two diesel engine works. It was necessary to bisect the affiliated California Cotton Mills and National Auto Fibers. On both sides of the freeway the revamped buildings have been cut back to the right of way line and new walls built concentric to the freeway center line.



Eastshore Freeway looking north, showing 29th Avenue Overpass in foreground, 23d Avenue divided overpass in center of picture, and 19th Avenue Overhead in background



Eastshore Freeway, looking south from temporary connection to Oakland city street system at Fallon Street. In center is 5th Street structure over Western and Southern Pacific Railroads and Lake Merritt Canal in center

Through portions of the project it was necessary to construct a gravity section center division wall between the two roadways. The use of this center wall permitted lowering the roadway on the high side of the super-elevated curve and thus effected a considerable saving in right of way width.

Roadway Drainage

Because of the generally flat grades throughout the project it was necessary to pick up roadway drainage water at very short intervals through the center curbed sections. Inlets consisting of curb openings at 12-foot intervals with four-inch plain concrete pipe discharging into a central drain

were installed in order to remove the surface water in those sections where the adverse combination of roadway slope and longitudinal grade prevented fast runoff. Approximately eleven thousand five hundred linear feet of parallel center drain was installed.

Construction of the freeway necessitated a great deal of cooperative effort between the City of Oakland and the Division of Highways. The Oakland city engineer's office and City Manager Hassler's office cooperated in every way with the Division of Highways in order to expedite the speedy completion of this section.

Included in the city's projects in connection with the freeway was the re-

placing of a sewer installation along East Eighth Street from Portwood Avenue to 23d Avenue and the replacement of a sewer along Kennedy Street from Frederick Street to Livingston Avenue. All sewer installations and relocations have been designed to eliminate, as far as possible, interference with freeway operations due to any future work in connection with these facilities. Where it was impossible to remove sewer crossings, the portions under the freeway were encased in concrete in order to provide against possible future failures.

... Continued on page 23

Chico Esplanade

*An Example of Early
Day Outer Highway*

By GILBERT MULCAHY, District Right of Way Agent

One of the interesting early day outer highway developments in California is to be found in the City of Chico, Butte County, where this year will be celebrated the 60th Anniversary of the dedication of the Esplanade as a monument to the foresight and planning of General John Bidwell, its founder.

MODERN FREEWAY and limited freeway design commonly is given credit for the advent of outer highways running parallel to the through lanes of traffic on the main highway, but separated to the extent that it is an entirely independent street to render service to the abutting properties which formerly had direct access to the through lanes of traffic.

The outer highway connects to the through lanes of traffic only at intersecting cross streets or at other locations provided by public authority. This so-called modern highway design tends to reduce to a minimum conflicting movements of traffic at locations that are extremely hazardous to the fast moving traffic on the main highway, and experience has proven that this type of design represents a tremendous increase not only in the safety of the traveling public but also to the local traffic.

The word "so-called" modern idea has been used in this article for the reason that outstanding highways were designed and built on the North American continent, including outer highways, before California was a part of the United States.

Outer Highway Not New

It is surprising but, nevertheless, a fact that El Reforma, the main arterial into the downtown business section of Mexico City was planned and constructed before California had what could be considered an all-year useable roadway.



Early day photo of Chico Esplanade, showing the old gravelled main roadway

Along El Reforma Boulevard, and located on the outer highway, is found the world-famous El Reforma Hotel, some of Mexico City's outstanding modern skyscrapers, and many of the city's finest modern apartment buildings.

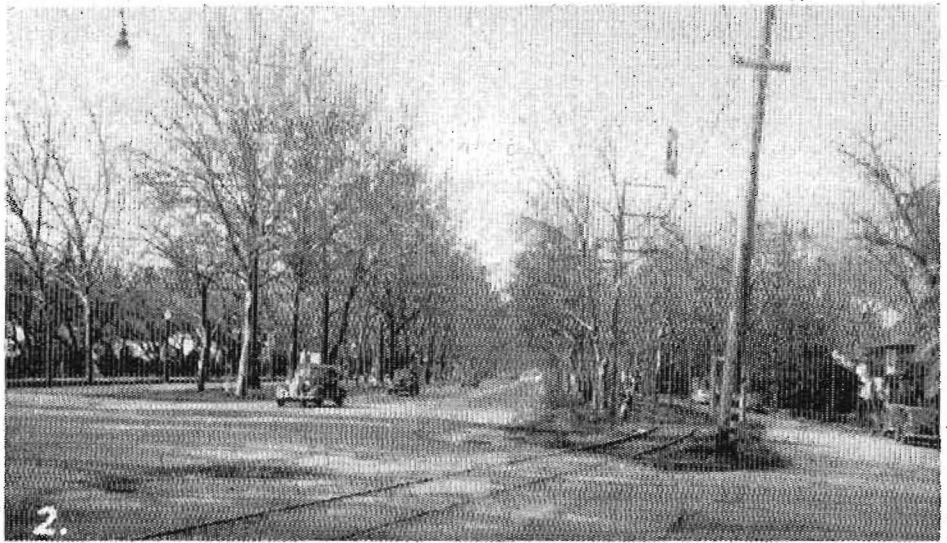
Main arterials were planned to include outer highways in South America and in Europe many years before the first freeway reached the planning stage in the United States.

In traveling along the highways and byways of California, we have found many outer highway developments that have been in operation for many years, and all of these old-time developments were the choice of the subdivider, not of any public agency.

As more and more outer highways are included as a feature of modern freeway design, the affected property owners and roadside merchants are reaching the conclusion that both the affected property owner and the traveling public rapidly become adjusted to this revival of an old-time proven beneficial method to all parties concerned in handling difficult traffic problems.

Chico Esplanade

An early day outer highway may be seen in Chico. It is the Esplanade which carries U. S. 99-E from First Street near the center of town to Lindo Channel, north of the city limits, a distance of 1.5 miles. The right of way is 165 feet in width, according to the Revised Map of Chico Vecino filed June 12, 1889, by General Bidwell. As it now



View of Esplanade at Memorial Way north of business district in Chico

exists, the main highway, 40 feet in width, tapering to normal 20-foot width at the north limits, is flanked by park strips about twelve feet in width on either side, with 20-foot outer roadways outside of the park strips as shown in Plat "A."

Originally, the parked strip on the easterly side of the Esplanade between the center roadway and the outer highway was sometimes used by horseback riders, while the one on the west side was for many years Chico's famous "bicycle path." With the advent of street cars about 1905, the equestrian path gave way as a location for car tracks, which are still in existence.

Six rows of European sycamore trees, planted the entire length of the

Esplanade, furnish relief from the summer sun and are remembered for the welcome shade by any tourist who has driven through the Sacramento Valley on a hot summer day.

John Bidwell, Pioneer

The early history of Chico is inseparably tied in with the life of John Bidwell, who came to California in 1841. In 1849 he purchased a large Spanish rancho from William Dickey. Chico and the surrounding highly cultivated agricultural area are the result. When John Bidwell came to California, this entire area of the Sacramento Valley was covered with oak trees and high grass. It was a paradise for wild life. Antelope, deer, and grizzly bear were found in great numbers. Local history states that in one day John Bidwell saw 200 grizzly bear, 13 in one group.

At first the area was devoted to grazing, and it was a common sight to see large herds driven through the town of Chico on the way to the railroad. In fact, after the first six rows of trees were planted the full length of what is now the Esplanade in about 1870, it was necessary to build board fences around each row of trees to protect them from the cattle drives. It is interesting to note that in planting the six rows of original trees, Bidwell showed that he was a practical man as well as a lover of shade trees. After nearly all the oaks were cleared out of the area and fencing began, it was discovered that no suitable trees

Outer highway of Esplanade between Second and Third Avenue



were available locally for fence posts. So General Bidwell planted the six rows of honey locust, which are not only fine shade trees, but make excellent fence posts. It was necessary to remove all the locust trees in 1914 when they grew old and maintenance costs became prohibitive. About 1916 the present six rows of fine European sycamore were planted.

For Leisurely Travel

The original conveyance of the Esplanade from General Bidwell specified that no gravel was to be placed on the side drives, which were to be used only for leisurely travel. The main roadway down the center was for heavy travel, and early county ordinances provided for a \$25 fine for heavy wagons found on the side drives. The larger part of the area was annexed to the City of Chico in 1918.

Photograph No. 1 shows the conditions in those old, more leisurely days. Conditions change, however, and in 1915 the graveled main roadway in the center was replaced with concrete pavement 15 feet in width, which still serves as the base of the center of the existing surfacing. With the advent of more traffic and building of fine homes adjacent to the Esplanade, the dirt side drives became obsolete and were surfaced in 1923 or 1924.

Photograph No. 2 shows the Esplanade at Memorial Way, just north of the central business district of Chico.

Parking along the outer highway leaves the main center roadway clear for through traffic



Traffic movements at the junction of Fourth Avenue with the Esplanade

Photograph No. 3 shows the neighborhood business district located on outer highway between Second and Third Avenues. Very little interference to the through traffic occurs.

Photograph No. 4 depicts traffic movements at the junction of Fourth Avenue with the Esplanade, with vehicles moving both ways on the Esplanade, entering the Esplanade from Fourth Avenue on the west, and one car traveling south on the outer highway. The mansion in the background is probably better than the average found along the Esplanade, but the typical residence along the outer highways is far superior to those found in any other section of Chico.

Photograph No. 5 is the Enloe Hospital, on the west side of the Esplanade between Fifth and Sixth Avenues. Note that all parking is along the outer highway, leaving the main center roadway clear for through traffic.

Nearly all the Esplanade within the city limits is residential except for the small neighborhood shopping center between Second and Third Avenues, the Enloe Hospital between Fifth and Sixth Avenues, and the Chico High School, between Lincoln and Sacramento Streets. It is pretty well established that residential property fronting on the Esplanade is much more desirable and at least twice as valuable as similar property elsewhere in Chico.

The benefits derived from the outer highways and enhancement of property values as a result of the old outer highway construction on the Esplanade in Chico is a fine example of what we may expect in the line of development and increased property values along new outer highways that are continually being constructed by the State in conjunction with our freeway program.

KEEP TO THE ROAD

Fixed objects along the highways, such as trees and posts, never yield the right of way to automobile drivers. For safety's sake, keep your eyes and your car on the road.

Desert Snows

Unusual Winter in San Bernardino
And Riverside Counties This Year

By L. R. McNEELY, Assistant District Engineer

DURING the past winter season snowfall occurred to a depth of two or more inches on all state highway routes within District VIII. Comprising all of San Bernardino County and all but the easterly portion of Riverside County in Southern California.

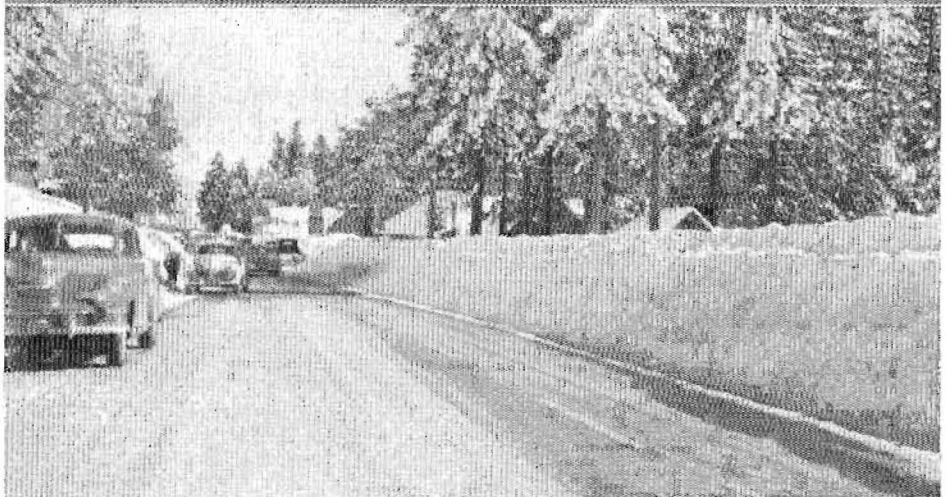
In the Mojave Desert and also in portions of the valley areas of San Bernardino and Riverside counties, the snowfall was of such depth that snow removal operations were necessary to clear the traveled way. Such operations were carried out on approximately twelve hundred miles of state highway during the past winter season.

During the average season snow sports are carried on in the San Bernardino Mountains on the Waterman Canyon-Big Bear Lake Highway, State Route 18; in the San Gabriel Mountains, Big Pines area; and during some years in the San Jacinto Mountains on the Palms to Pines Highway, State Route 74. In the above areas on all state highways above an elevation of 2,500 feet snow removal operations are carried out on approximately two hundred miles of state highway.

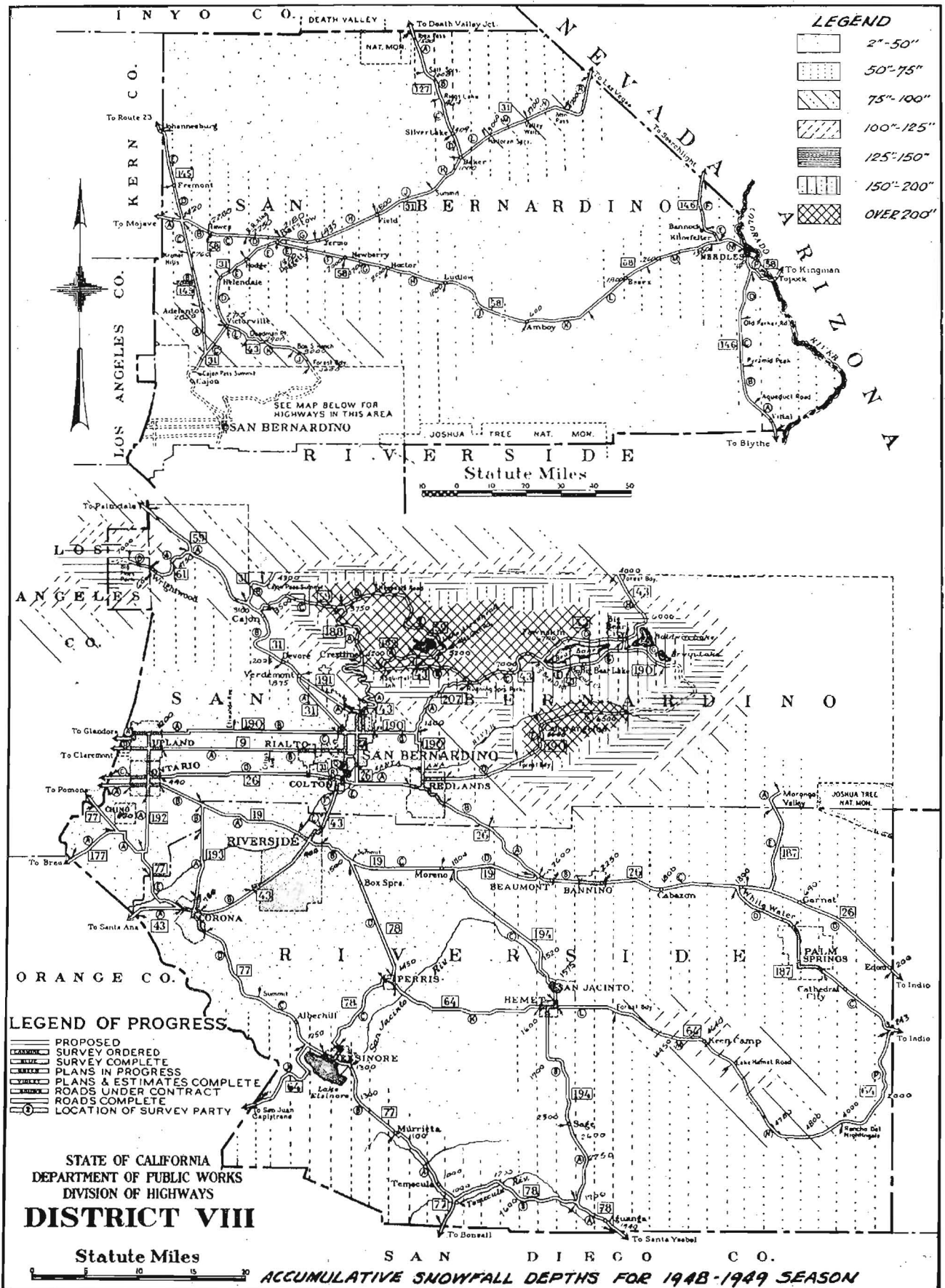
First Snowfall

The first snowfall occurred on Waterman Canyon-Big Bear Lake Highway, State Route 18, on October 30, 1948. Snowfall did not occur during the month of November. The first general storm occurred on December 3, 1948, which consisted of a depth of from five to six inches at the higher elevations in the San Bernardino Mountains. In the mountain areas between December 3, 1948, and March 31, 1949, snowfall occurred in measurable depths on a total of 42 days. The total snowfall amounted to from two to two and one-half times the average for the past five years.

Reference is made to the accompanying map showing the ranges of depth of snowfall throughout the district. The areas on which over two hundred inches of snowfall occurred



These photographs show snow depths at various locations in District VIII. UPPER—Drift area in "No Man's Land," San Bernardino Mountains. CENTER—Snow falls in Mojave Desert. LOWER—Snow sports area San Bernardino Mountains



were at an elevation of from 4,000 to 6,500 feet. The highest elevation on the Waterman Canyon-Big Bear Lake Highway is approximately seven thousand four hundred feet. The Lakeview Point Maintenance Station, located approximately eight miles southerly from Big Bear Lake, is at an elevation of 7,200 feet.

The greatest depths occurred in the vicinity of Lake Arrowhead, elevation 5,200 feet, with a total of 240 inches; and at the Burnt Mill Maintenance Station, located two miles southerly at an elevation of 5,600 feet, a total depth of 245 inches was recorded. Lakeview Point Maintenance Station, elevation 7,200 feet, recorded a total of 200 inches.

Mojave Desert Blanketed

The most severe snowstorms occurred between January 9th and 14th and from February 2d to 7th. During the storm of January 9th to 14th a total snowfall of 77 inches was recorded at the Burnt Mill Maintenance Station, and snowfall was general throughout the district.

The Mojave Desert was blanketed with from eight to twenty-four inches of snowfall with an increase up to three or four feet at the higher elevations in the desert areas. A depth of 15 inches occurred on U. S. Route 66 at Amboy which is at an elevation of 600 feet.

During and for several days following the general storms, maintenance equipment worked around the clock supplemented by equipment rented from private vendors, such as motor graders and bulldozers.

On the Cajon Pass, U. S. Route 66, and also on U. S. 60 between Riverside and Beaumont, and U. S. 99 between Redlands and Beaumont, considerable difficulty was experienced in handling passenger cars and especially trucks, due to the snow pack on the traveled way and also to icy conditions. During the day in the above areas there was sufficient melting of the snow pack to create favorable conditions for icy pavement surfaces during the night. Night crews were necessary to carry out sanding operations.

High Winds Drift Snow

In addition to the amount of snowfall, high winds made conditions more difficult by the drifting of snow onto

... Continued on page 67



These photos show snow removal operations in San Bernardino Mountains. UPPER—Blade plow in action. CENTER AND LOWER—Snogos in operation

Fort Moore Hill

Part of Historic Site Will Be Razed for Hollywood Freeway

By SPENCER V. CORTELYOU, Assistant State Highway Engineer

WHEN THE CONTRACT was awarded to Guy F. Atkinson Company of San Francisco on January 18, 1949, for the removal of the easterly portion of Fort Moore Hill in the Civic Center of the City of Los Angeles between Hill Street and Spring Street, an important step was taken in the Hollywood Freeway construction, representing the culmination of planning and negotiations of over ten years between the city, county and State.

This construction contract, figuratively and literally within the shadows of the United States Federal Building, the Los Angeles City Hall, and the Los Angeles County Hall of Justice, provides not only for the excavation and removal of a portion of Fort Moore Hill but also for the demolition of the existing tunnel on Broadway that is now used for pedestrian and vehicular traffic as well as for the double-track streetcar line of the Los Angeles Transit Company.

The contract also includes the excavation that is necessary for the portion of the Hollywood Freeway under Broadway, the construction of new pavement on Broadway from Temple Street to Sunset Boulevard, and the

construction of bridges to carry Broadway over the freeway and over the inlet ramp to be provided so that traffic on Broadway can have access to the freeway for traveling to Hollywood and San Fernando Valley.

Cooperative Project

Although the contract is being handled by the State Division of Highways, it is a cooperative contract providing for work that will benefit the County of Los Angeles and the City of Los Angeles in the development of the ultimate plans for the Los Angeles Civic Center. The existing tunnel on Broadway and Fort Moore Hill has been a great obstacle in the path of the Hollywood Freeway and the civic center development.

The Los Angeles Civic Center Authority is the official coordinating agency of the city and county, having responsibility for developing the ultimate plan of the civic center. This authority has been instrumental and most helpful in working out the many administrative details so that part of Fort Moore Hill could be razed, the Broadway Tunnel demolished, and the grading for the Hollywood Freeway

carried out all in one construction contract under general state supervision.

Prior to this contract, a three-party agreement involving exchange of properties and removal of buildings from the site, also provided that the State pay for that portion of grading, Broadway Tunnel removal, and new bridge structure, within the freeway, with the city and county sharing equally in the grading and tunnel removal in the remaining Fort Moore Hill area, and the city paying for the cost of constructing relocated Broadway.

This resulted in an approximate participation in construction cost of the present contract, as follows:

County	\$156,000
City	248,000
State	530,000
Total cost	\$934,000

Site of Pioneer Fort

The old Fort Moore Hill had an important place in the early history of the City of Los Angeles. Fort Moore was named in honor of Capt. Benjamin D. Moore of the First United States Dragoons, who was killed by a lance

View looking westerly from site of Fort Moore Hill. The street shown is the present Hill Street. The two-story building with cupola is the historic old Los Angeles High School, which, with other buildings beyond, has to be moved



thrust in the bloody battle of San Pascual in 1846. Fort Moore was laid out by Lieut. William H. Emory of General Kearny's staff. It was planned for a garrison of 100 men and was to have a breastwork 400 feet long with a bastion for six cannon in barbette.

The work on the fort was commenced in April, 1847, by sailors and marines commanded by Commodore Stockton. Differences between the commodore and General Kearny interrupted the work for a time. It was continued by a Mormon battalion under Lieut. Col. John C. Fremont, and though not completed, the fort was dedicated on July 4, 1847. The flag was raised on a pole 150 feet high, made from two pine trees brought from the San Bernardino Mountains by a crew of native Californians and Indians. The original flagpole must have been considerably taller than the present existing flagpole above the south portal of the Broadway Tunnel, as shown in the accompanying photograph, because the existing flagpole is only 80 feet high.

After Fort Moore was abandoned as a military establishment, the hill became the site of the town gallows, and dozens of outlaws and cutthroats were hanged there.

Later, the hill became the choicest residential section of the city. The Banning residence and stable were still standing when work was started on this project. According to some old residents, the Banning home was reputed to be the old officers' quarters and the stable was a station on the pony express system.

Heavy Excavation

The construction work under the Atkinson Company contract will involve the removal to the Bishops Road disposal area of approximately 900,000 cubic yards of roadway excavation. The upper 27 feet is a granular material which will be stockpiled for later use as subbase material in the construction of the freeway. Under this granular material the soft shale rock will be excavated to a depth of 75 to 90 feet. This rock lies in thin strata which are

almost vertical with the tilt from south to north being about 20 degrees. The tunnel to be removed is 765 feet long; the inside width is 40 feet, the clear height is 23 feet.

All streets in the downtown area of the City of Los Angeles carry such a large volume of traffic every day that none of them can be completely closed for construction operations. As the photographs show, a detour has been built to carry the Spring Street traffic around the grade separation bridge now under construction that is to carry Spring Street over the freeway.

Broadway Tunnel Removal

The removal of the Broadway Tunnel would have been too hazardous to carry out while traffic was using it. Therefore, after excavating about 200,000 cubic yards easterly of the tunnel, a detour road 40 feet wide will be built about 125 feet east of the tunnel, and the streetcars and automobiles will be rerouted thereon. This detour will be paved with four inches of plant-mixed

North end of Fort Moore Hill. Barricade erected by contractor along Spring Street detour to catch falling rock and dirt is shown in left foreground. Right center shows resident engineer's office, contractor's offices, construction yard and county parking ground

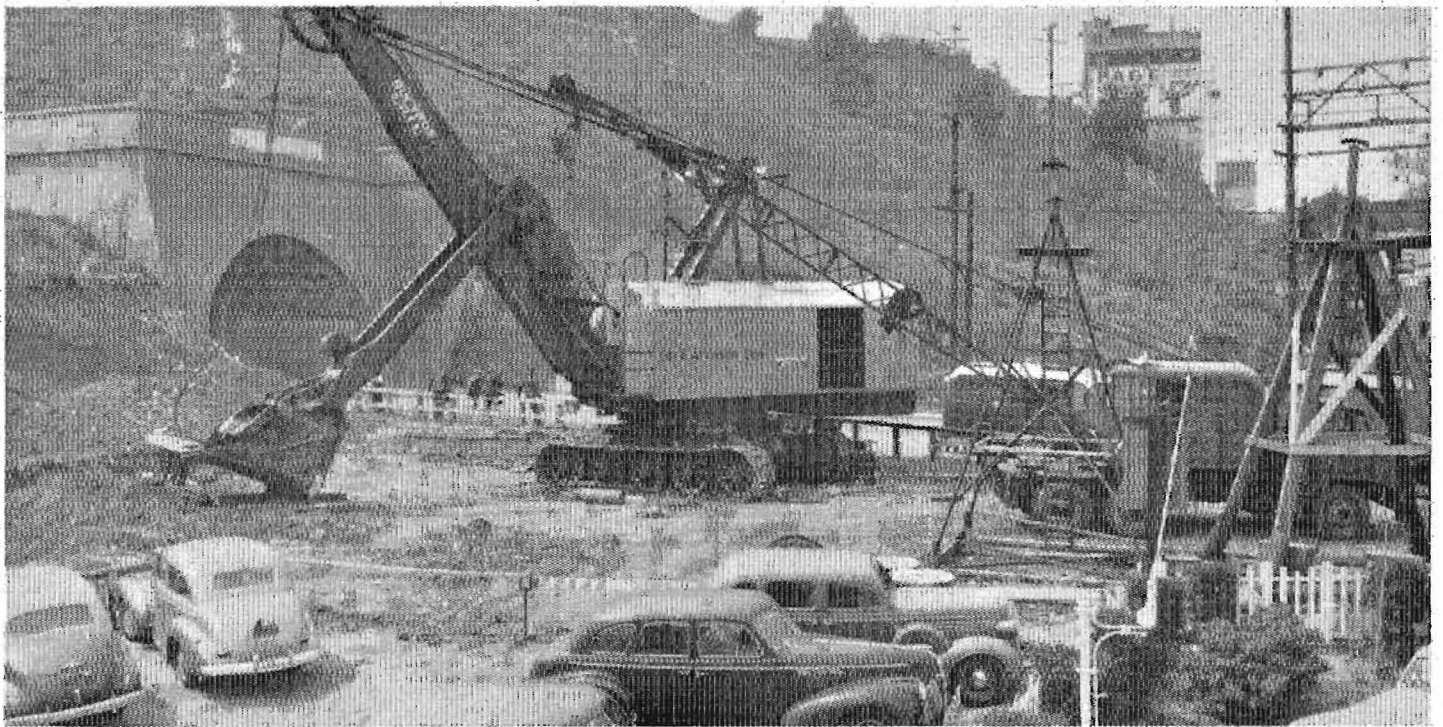




This portion of Moore Hill will be removed. Spring Street detour in foreground. California Street on left. Hollywood Freeway will go through to the right of California Street. South portal of Broadway Tunnel can be seen left center

South portal of Broadway Tunnel that is to be entirely removed. Broadway detour will take off to the right of tunnel and will require the removal of a portion of the portal prior to the tunnel removal





View of north portal of Broadway Tunnel before start of excavation operations. The contractor's shovel is an electrically operated rig weighing 185 tons, supplied with a 2300-volt current. Capacity of the dipper is six cubic yards

surfacing laid on the best of the granular material from the cut.

Because the present structural strength of the Broadway Tunnel might not be sufficient to carry eccentric loadings, the cut slope for the detour is being carried down at a distance of 30 feet from the tunnel. The new Broadway pavement will have a clear width of 60 feet between standard curbs. The center strip of 19 feet to provide for the double-track streetcar line of the Los Angeles Transit Company will be paved with five inches of portland cement concrete laid on the ballast and surfaced with two inches of asphalt concrete. On each side of this strip will be a 13.5-foot lane paved with eight inches of asphalt concrete laid on a one-foot course of untreated rock base. Outside of these lanes will be a parking lane seven feet wide of eight-inch portland cement concrete laid on one foot of untreated rock base.

Excavating Equipment

The contractor's heavy excavating equipment is unique within a large city downtown business area, and was chosen to permit the excavation and old tunnel removal to progress in a continuous operation. This was considered to be both the safest and most

expeditious manner of carrying out this work, which could not be accomplished by the use of smaller equipment.

The original Broadway Tunnel was constructed in 1900 by the City of Los Angeles. The grade of this tunnel was appreciably lowered, and the tunnel reconstructed in 1910, leaving in place the arched sides and roof of the original tunnel. Both of these were of brick masonry, but the present bore visible to those traveling through the tunnel does not indicate the large cross-section of the double-tunnel removal confronting the contractor. The six-yard Bucyrus-Erie electric shovel, weighing some 185 tons, is supplied by a 2,300-volt current from a substation erected by the Department of Power and Light of the City of Los Angeles.

Night Operations

Present operations are confined to the excavation of the rather narrow strip required for the temporary detour for Broadway east of the existing tunnel. Hence, maximum production of this large shovel has not yet been realized since these confined operations permit loading only on one side with a three-fourths swing of the shovel. Approximately 4,500 cubic

yards is being presently excavated per shift. To avoid hauling through the heavy daytime traffic, the working hours are from 7 p.m. to 6 a.m. The brilliant banks of floodlights, and the numerous lights on the shovel and on the trucks, and the smooth, almost noiseless, and seemingly effortless operation of the shovel, form an entrancing and spectacular nighttime picture.

It is estimated that this construction contract will be completed during the summer of 1950. The work is being carried out under the general supervision of District Engineer W. L. Fahey and Assistant District Engineer Frank B. Cressy. The resident engineer is Ray A. Collins. The superintendent for the contractor, Guy F. Atkinson Company, is E. M. Raimer.

Hollywood freeway design outlined on aerial photo on the opposite page shows the route of the Hollywood Parkway from its connection with the Santa Ana Freeway at Spring Street. The first building in lower left is the Federal Building and beyond it the Los Angeles County Hall of Records. The small building between Hill Street and Grand Avenue to the right of the Parkway is the old Los Angeles High School building, which is to be moved. Beyond it are the Grand Avenue grade separation and Figueroa Street bridges



New Subway

Work on 12th Street Underpass
In Sacramento Half Completed

By T. C. ROYCE, Associate Bridge Engineer

ONE YEAR after the bids were taken, work on the new 12th Street Underpass in Sacramento is approximately half done. The 12th Street Underpass is one of the two approaches to the City of Sacramento from the north and east and has been, since 1904, a two-lane, narrow, shallow underpass in which trucks frequently became stuck, blocking all traffic. The Southern Pacific Company operated 11 tracks, including two mainline tracks over the structure. This bottleneck is fast being converted to a modern four-lane divided highway underpass with clearance of 15 feet.

Due to the numerous railroad tracks over the structure, it had to be constructed in three separate units. Unit one, on the south end, 63 feet wide, carries two mainline tracks and two yard tracks. This portion has been completed and in service for over two months. The work of removing the old structure in the north section has

been completed and construction of the two abutments and center pier is now in progress.

Before the first unit could be started, the Southern Pacific Company had to remove four yard tracks for 300 feet each way from the structure. It was also necessary to construct two mainline shoofly tracks and two three-track, four-bent trestles to carry temporary tracks across the center portion of the structure. Before the second unit could be started the railroad had to construct a timber trestle to the north of the structure and remove three yard tracks to make connections to existing commercial spur tracks.

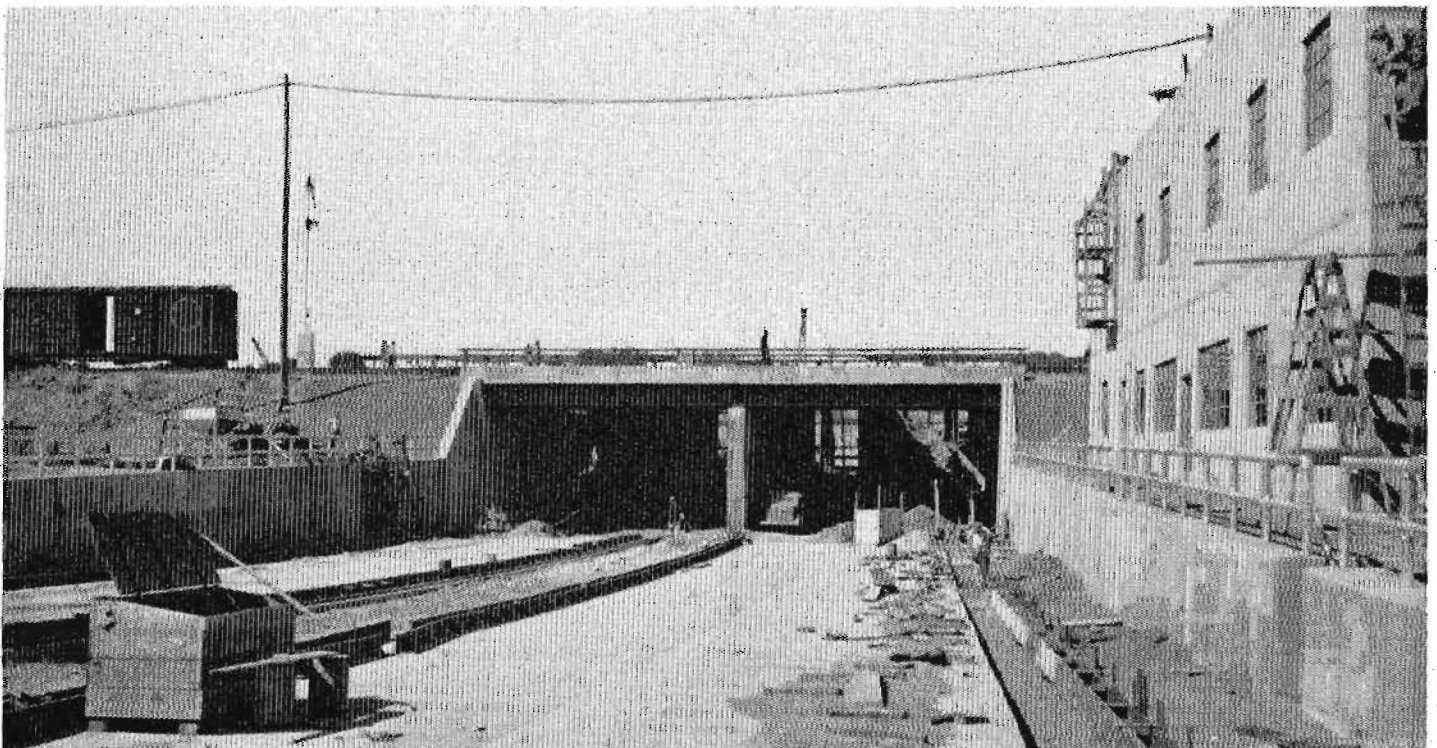
Each abutment was a mass concrete structure without reinforcing and was more than seven feet wide at the bottom, resting on two rows of timber piles. In breaking out the old footings, numerous pieces of railroad rail reinforcing the concrete were encountered. The timber piles in the center

were found to be as good as the day they were placed in 1904 and were incorporated into the new structure in place of a planned row of new piles.

After the work of removing the old structure was begun, it was found that under the existing pavement of concrete and asphalt was another similar pavement of concrete and asphalt buried under a layer of sand up to three feet thick. The second pavement was apparently placed some time after 1914 when the underpass was raised in connection with the raising of the levees along the north and east city limits.

Records of the original construction of the underpass in 1904-05 were lost in the San Francisco fire, but it is known that it was constructed by the Southern Pacific Company with the city sharing the cost and was done for less than \$100,000. The new structure with the approaches and right of way acquisitions is costing a total of \$880,000, of

Widening of the 12th Street underpass in Sacramento is about 50 percent complete

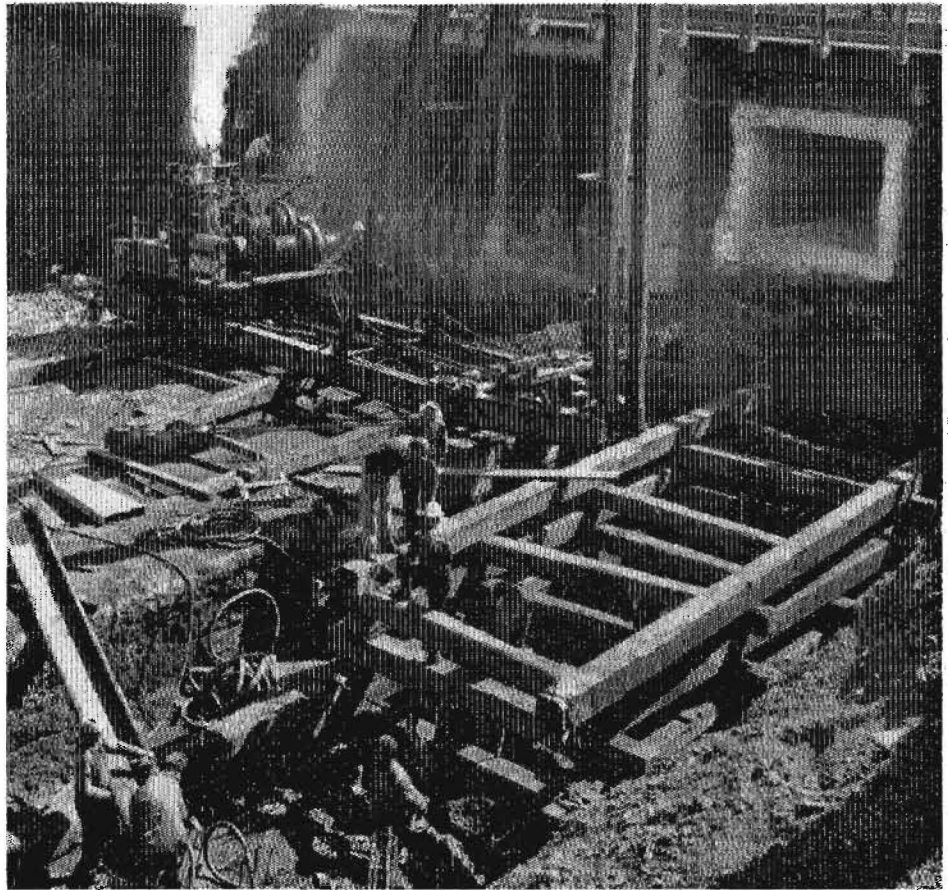


which the City and County of Sacramento pay \$200,000 and the Federal Public Roads Administration provides \$680,000. Additional costs, amounting to more than \$60,000 not included in the total cost, will be borne by the P. G. & E., the Pacific Telephone and Telegraph Company, and the City Water Department in relocating their lines.

Along with the contract work it was necessary to perform certain right of way work. The wall of one warehouse east of 12th Street between the alley and the Southern Pacific tracks had to be moved back five feet. The walls were concrete brick. The new wall is constructed of reinforced concrete with tie beams from the footing to the new retaining wall to take care of the overturning forces.

It is estimated that unit two and the center unit will be completed by the end of July. Completion of road and pavement is estimated for about the first of September.

The contractor is Bates and Rogers Construction Corporation of Chicago. The structure was designed by and the work is being administered by the Bridge Department. The author is resident engineer.



Close up of pile driving operations on 12th Street underpass project

Rapid Progress

Continued from page 10...

In connection with the activities of the East Bay Municipal District's current project for constructing the sewage disposal system for East Bay municipalities, it was necessary for it to parallel the freeway with its new 72-inch interceptor system for approximately two miles.

A portion of the project east of the Fifth Avenue Overhead lies through an old swamp. It was necessary to strip from two to six feet in this area and backfill with selected material from roadway excavation. The general flatness of the surrounding area made disposal of unsuitable material a considerable problem and necessitated hauling to dump sites at the southern end of Alameda Island. Through the

section of the project formerly occupied by a shingle mill, it was necessary to remove several thousand cubic yards of sawdust prior to placing the roadway embankment.

Structural Details

The freeway section is six-lane, divided with an 8- to 10-foot dividing strip. Each roadway is 36 feet wide, with 8-inch Portland cement concrete pavement placed on 4 inches of crusher run base and 8-inch minimum imported borrow. Six-foot plant-mixed shoulders and 2-foot Portland cement concrete curb and gutter are provided for the outside lanes, with 2-foot curb and gutter adjacent to the inside lanes.

The outer highway section is, generally, 3-inch plant-mixed surfacing on 6 inches of crusher run base and 1-foot minimum imported borrow.

The approximate quantities of the major items of work are as follows:

Removing concrete	6 700 cu. yds.
Roadway excavation	133,000 cu. yds.
Structure excavation	28,500 cu. yds.
Imported borrow	123,000 tons
Overhaul	4,500,000 sta. yds.
Crusher run base	52,500 tons
Plant-mixed surfacing	11,500 tons
Portland cement concrete (pavement)	26,000 cu. yds.
Portland cement concrete (structures)	2,600 cu. yds.
Reinforcing steel	176,500 lbs.
Portland cement concrete (Curbs, gutters, sidewalks)	5,100 cu. yds.
Chain link fence	31,000 lin. ft.
Reinforced concrete pipe	17,000 lin. ft.
Miscellaneous iron and steel	49,000 lbs.
Electroliers (all types)	122 each

As previously stated, the Fredrickson & Watson Construction Company was the contractor on Contract 0-4TC48-F. The work was done under the general direction of Jno. H. Skeggs, Assistant State Highway Engineer; Assistant District Engineer R. P. Duffy, District IV, with H. A. Simard, resident engineer, in direct charge of the work.

County Project

*San Joaquin Builds New
Span Across Mokelumne*

By JULIUS B. MANTHEY, San Joaquin County Road Commissioner

Editor's Note: This is a Federal Aid County Road Project. The engineering was done by San Joaquin County Forces

NEWEST LINK in the San Joaquin County Federal Aid Secondary Road System, a bridge across the Mokelumne River on FAS Route 901 between Thornton and Woodbridge, now is in service as a unit of the farm-to-market highway facilities in northern San Joaquin County.

East-west traffic across the northern portion of San Joaquin County has been hampered for many years by the lack of facilities for crossing the Mokelumne River between Thornton and Woodbridge. As there is a large volume of truck traffic hauling produce to processing plants in the vicinity of Thornton, Walnut Grove, Woodbridge, and Lodi, it was considered imperative to furnish more direct facilities to serve this highly developed agricultural area.

FAS Route 901, known locally as

the Peltier Road, extends from the vicinity of Thornton to the vicinity of Lockeford and, with the recently completed project furnishing the crossing of the Mokelumne River, provides a cross-country artery which will serve considerable through traffic as well as local residents and farm-to-market vehicles.

The design of the structure was financed with funds provided by the State Legislature under postwar planning grants. San Joaquin County, with its many miles of road serving the Delta areas, is confronted with a serious problem in attempting to replace the many bridges which have become obsolete.

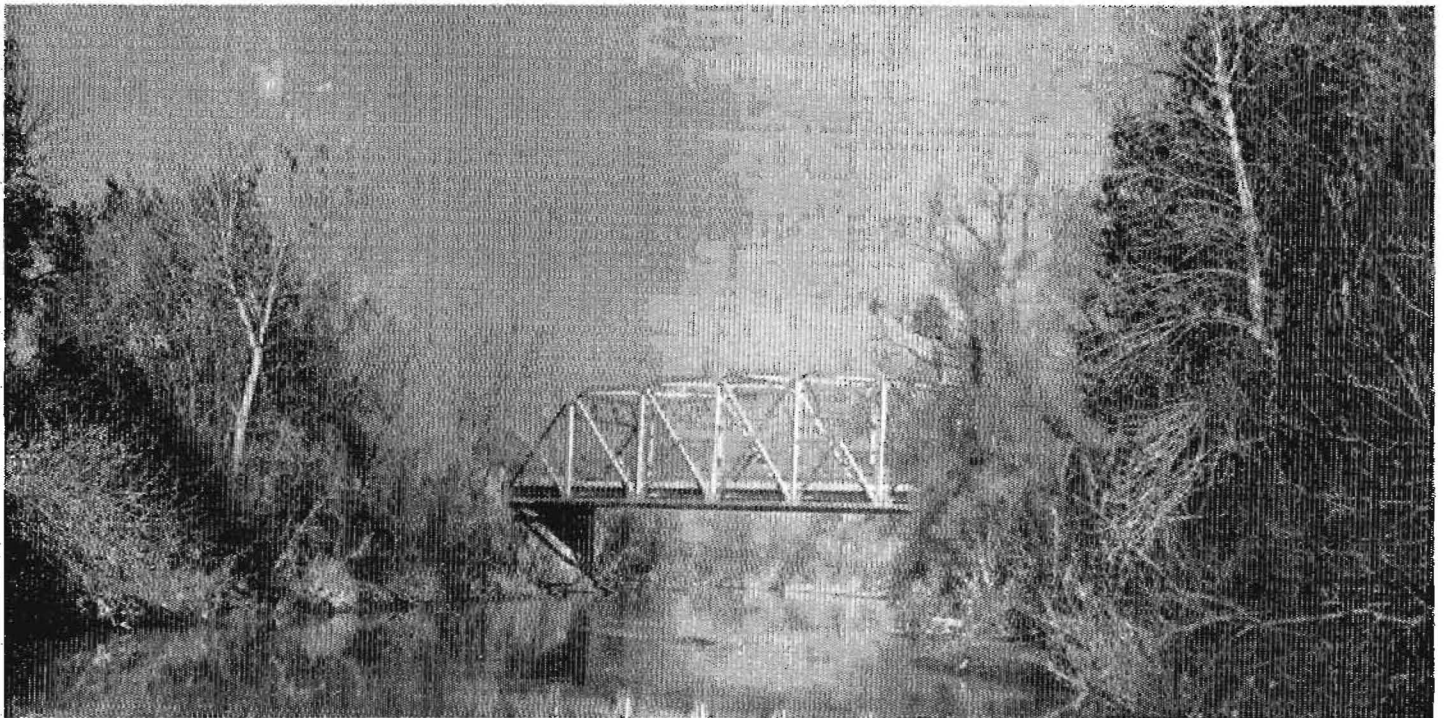
The new bridge, constructed as part of this project, consists of a 150-foot steel truss span with 731 feet of concrete slab approach trestle, a total

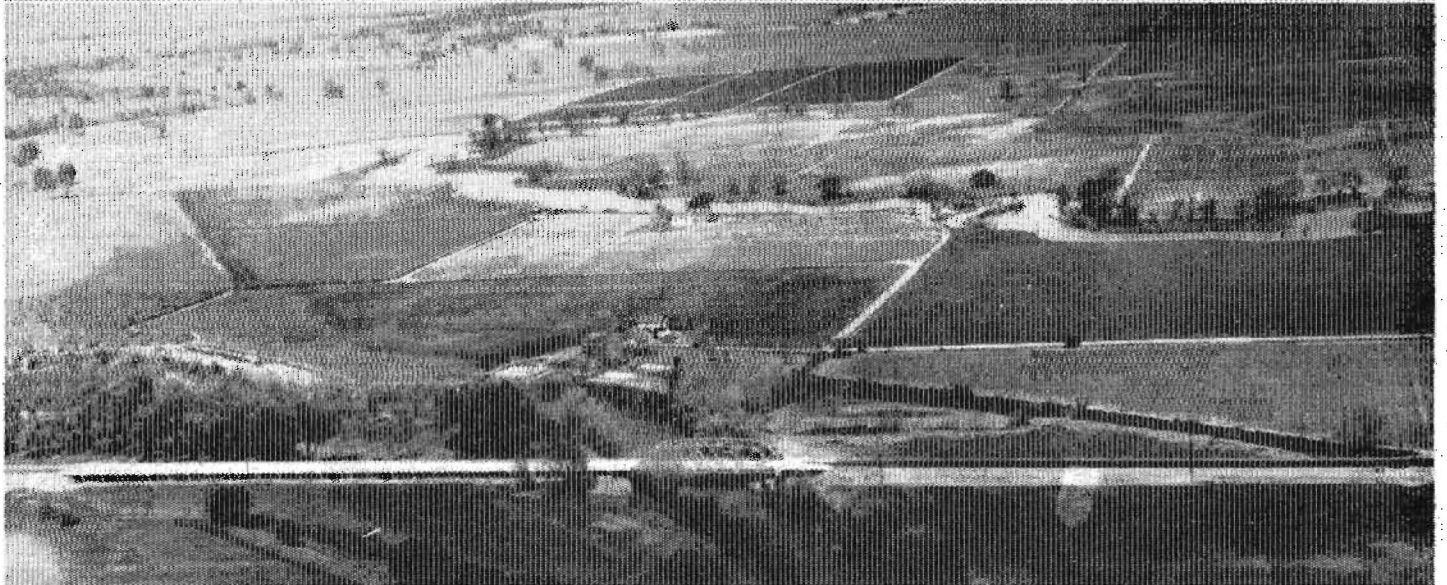
length of 881 feet, and provides a clear roadway width of 24 feet. Constructed as a joint venture by A. A. Edmondson of Glendale and A. L. Miller of Sacramento, the total cost of the bridge, exclusive of engineering, was \$164,233.55.

The 0.82 mile of approach road consists of a 3-inch by 22-foot plant-mixed surface placed on a 6-inch by 24-foot untreated rock base, with 4-foot bituminous treated gravel shoulders. Constructed by C. C. Wood of Lodi, the cost of the road work was \$50,511.84, exclusive of engineering.

Right of way and preliminary and construction engineering were provided by San Joaquin County. The contract costs were financed from federal aid secondary funds provided by the Federal Aid Highway Act of 1944 and state matching funds provided by the County Highway Aid Act of 1945.

Span of new Mokelumne River bridge. This view is looking northwest and down the stream





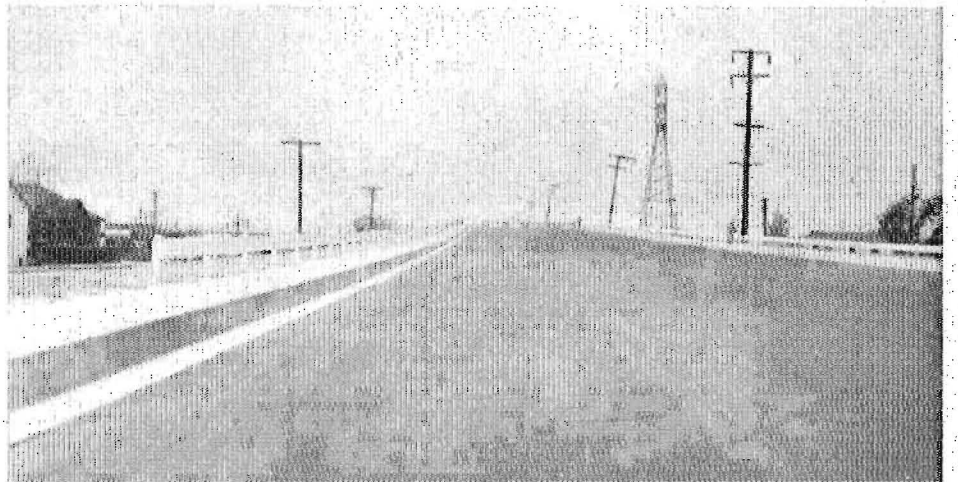
UPPER—This view looking northeast shows new bridge and portion of span across Mokelumne River

CENTER—Looking north at the new bridge on FAS County Route 901

LOWER—Deck of new bridge looking west

Construction engineering for both contracts was performed by county forces. D. C. Nelson acted as resident engineer on the bridge project, and K. D. Thomas was resident engineer on the road job.

State Highway Engineer G. T. McCoy has expressed his appreciation for the excellent supervision of the contracts by the San Joaquin County Road Department.



Prison Labor

Story of Highway Road Camps
In the State of California

By G. A. TILTON, JR., Supervising Highway Engineer

This is the second of a series of articles appearing in *California Highways and Public Works*, recording the history, legislation, and 34 years experience in the operation of State Highway Prison Road Camps in California. The first article, covering history and legislation, was published in the March-April issue.

This article outlines the interrelationship of the administrative organizations of the custodial agency and the production agency.

As OUTLINED in the preceding article, legislative provisions governing prison road camps require that the Division of Highways of the Department of Public Works designate, supervise and maintain necessary camps and commissariat. Statutes further provide that the Department of Corrections shall have full jurisdiction over the discipline and control of prisoners assigned to the road camps.

Under the above legislative controls it is evident that efficient operation of the camps will depend, to a great extent, upon cooperation between the custodial agency and the production agency.

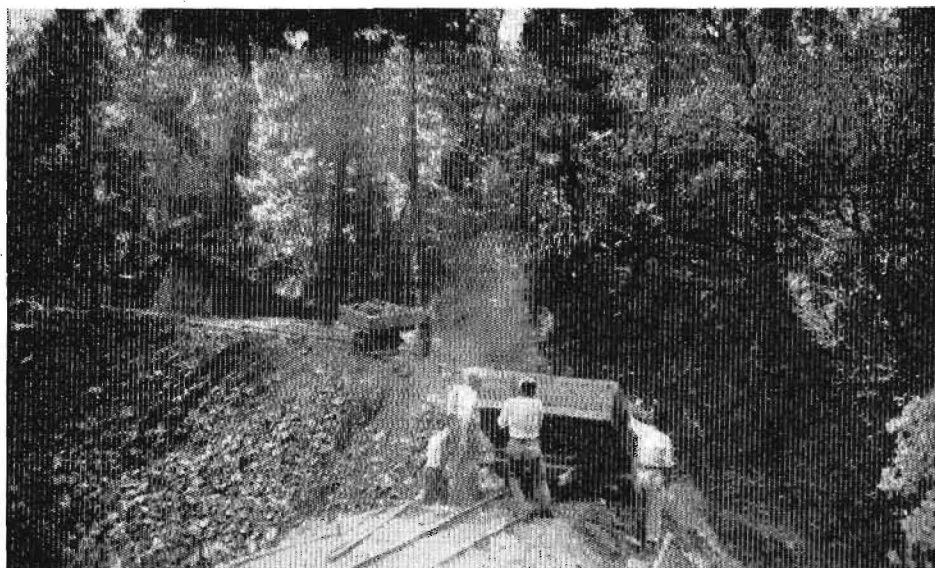
The unique success of the prison road camp system, as developed in California, can be attributed largely to close harmonious relations existing between the administrative organizations of the Department of Corrections and the Division of Highways.

Selection of Prisoners Essential to Success

Essential to this success is the consideration given by prison authorities to the selection of prisoners to man the camps. They must not only meet the minimum custodial-risk requirements of the Department of Corrections and Adult Authority, but they must be capable of economic production for the Division of Highways.

From the custodial agency's point of view, road camps serve primarily to prepare prisoners for return to free society—both physically and psychologically.

Their employment in the road camps tends to relieve congestion and reduce idleness in the prisons, and the fact that road camp inmates are self-supporting relieves the prisons of the cost of their upkeep.



Hand labor methods of building highways in mountainous areas with inmate labor. UPPER—Track and dump car in Shasta County in 1916. LOWER—Teams, plows and fresno scrapers along Smith River in Del Norte County in 1923

One Year Minimum Camp Tenure

Insofar as the production agency is concerned, the length of time prisoners serve in camps is of prime importance.

Experience of the Division of Highways indicates that economic construction and efficient management of prison road camps requires an average inmate

camp tenure of not less than one year. This length of time will allow for a two-month hardening-up period and 10 months of full productiveness.

Camp tenures of less than one year tend to increase construction costs and reduce inmate net earnings.

From the prisoner's point of view, it takes at least one year for him to accumulate sufficient earnings to his credit to adequately tide him over the inevitable readjustment period that must be faced upon release.

Camp Quotas Established by Agreement

Individual camp quotas are established by agreement between the Department of Corrections and the Division of Highways.

Having once established a camp quota, it is important to economic production and efficient organization that this quota be maintained at full strength by the custodial agency.

Eligible List Maintained

In order that prisoners will be available for initial quotas and for replacements, the California Adult Authority screens and maintains an eligible list from which the Department of Corrections selects men for the camps.

Before an inmate can qualify for the camp eligible list he must meet the following requirements:

- (1) A voluntary request must be made by the inmate.
- (2) His behavior record in prison must be satisfactory.
- (3) He must be approved by the prison medical officer as physically capable of productive work.
- (4) He must be classified as a minimum custody risk.
- (5) His potential tenure in camp must be six months or more, and preferably one year.
- (6) The nature and record of the crime for which he was convicted must be such as to reasonably justify assignment to an honor camp.

Application Form

Each prospective candidate for a road camp is required to sign the following application for camp assignment:

"I, the undersigned, hereby make application for camp assignment. The rules and regulations governing camp assignments have been read to me and I have received a copy of these



Early day methods of building highways with prison labor. UPPER—Finishing roadway with horses and carts along Klamath River, Siskiyou County, 1920. CENTER—Excavation with teams and slip scrapers in Mendocino County, 1916. LOWER—Pioneering trail on North Fork of Yuba River, Sierra County, 1916

rules and regulations which I am willing to abide by.

"It is understood that my earnings will be subject to such deductions as are determined to be necessary to meet my share of all expenses incurred in the operation of the camp. I further understand that should I leave the determined confines of the camp, or the property on which the camp is located, without permission of the supervisor in charge of the camp, I shall be considered as an escape from prison, and subject to the provisions of all laws and disciplinary measures applying to such an escape. It is also understood that should I, through any acts of my own, give cause to be returned to prison, I shall be subject to disciplinary action, including loss of any and all time credits and the forfeiture of any earnings.

No.....

The foregoing application and acknowledgment signed in my presence this day of, 1949."

Inmates Eager to Work

There is probably no greater pleasurable anticipation in the gamut of human emotions than the prospect of departing prison environment after years of close confinement.

Having once reached the eligible list, the inmate eagerly awaits the time he is to be sent to a camp. Immediately prior to prison departure he is interviewed personally by a prison official and told that he is being placed on his honor to obey all camp rules, and that he is expected to work at any tasks assigned to him.

Early in the morning on the day prisoners are scheduled to leave for a road camp, they are quickly readied for the long trip and transported by station wagon in small groups of four to six men under custody of a correctional officer—larger groups for initial camp quotas being transported by bus.*

Arrival in Camp

Upon arrival in camp, new inmates are promptly assigned to comfortable quarters and acquainted with camp routine and rules by the senior camp

* As provided by recent statute amendments, custodial services and transportation of inmates between the institutions and camps is now furnished by the State, through the Department of Corrections, without cost to camp inmates—1947 Statutes, Chapter 1380.

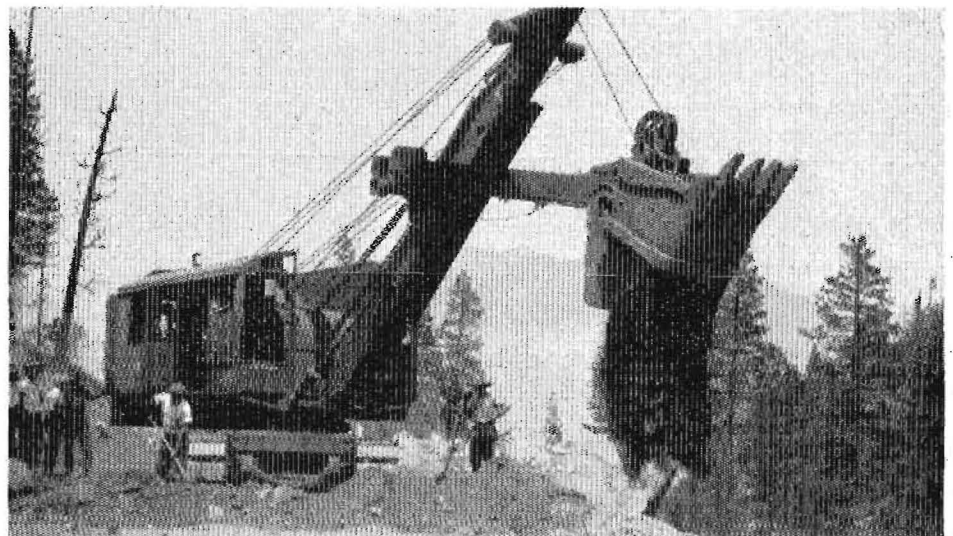


Pioneering Kings Canyon Highway in Fresno County with modern equipment, free operators, and inmate labor—1936

supervisor responsible for their custody.

The day following arrival in camp, the prisoner comes in active contact with state highway personnel for the first time, and the relative freedom of an outdoor life.

This is another scene in Kings River Canyon in 1936



State Highway Camp Organization

A highway construction superintendent is placed in responsible charge of each road camp by the Division of Highways. All construction work and camp maintenance activities are under his direction.

As depicted by the accompanying organization chart, inmates are assigned to highway construction or to camp maintenance. Construction crews are made up of eight to ten men under the direction of free foremen. Men assigned to camp maintenance work under the immediate direction of a commissary clerk.

Construction personnel are transported on work days to and from the camp to the site of the road work in job busses or trucks especially equipped for that purpose.

Unfair Treatment Not Tolerated

Free highway foremen are required to handle and direct inmate crews as they would any similar group of free workers. Highway personnel in charge of construction or camp maintenance are not permitted under any circumstances to treat inmates unfairly. Standing instructions to free men in this respect are quoted from the 1948 Division of Highways Prison Road Camp Manual:

Foreword to Manual

"The obligation of free men employed in these camps to observe proper conduct at all times is greater than that required in ordinary construction camps."



Erosion control with prison labor on Angeles Crest Highway, Los Angeles County, in 1938. Finished work is shown in background

Road Camp Manual

Topic 5.15:

"Free employees supervising inmates shall at all times treat camp inmates justly and fairly, and in no case will abusive language or an overbearing attitude toward them be tolerated."

Inmates are expected to give a reasonable day's work. Like any crew of free laborers, there are good workers and poor workers. If, after fair trial under more than one foreman, and on various types of work, an inmate shirks work tasks assigned to him, he is returned to the parent institution upon request of the camp superintendent.

A job clerk keeps all records of construction costs, free pay rolls, requisitions, job supplies, and reports.

Camp Maintenance

Under the road camp pay system, the inmate is paid a daily wage for each day he performs work for the Division of Highways. All expense of his

upkeep, including feeding, clothes, medicine, medical attention, toilet articles and commissary supplies are deducted from that wage. The balance is credited to his account. Although the average net earning per inmate day is nominal, this small amount is important to him and his morale.

With a statute ceiling on the amount prisoners can be paid, and the necessity of maintaining a net credit earning and solvency of the prison road camp fund, efficient management of camp maintenance is exceedingly important to all concerned.

As pointed out in the preceding article,* the maximum amount an inmate can be paid is limited by statute to \$3.50 per day. At present, the wage per eight-hour working day is established at \$3.20. Under present conditions, after deduction for maintenance, the average net earning is approximately 50 cents per day, or \$13 per month, on the basis of 26 working days per

month. If the average man works steadily throughout the year and has few layoffs for sickness or bad weather, he may accumulate \$150 or more.

A commissary clerk is assigned to the management of camp maintenance under direction of the camp superintendent. His duties include ordering and issuing messhall supplies, foodstuffs and commissary supplies, direction of messhall, camp hospital, barber shop, tailor, cobbler, miscellaneous camp maintenance activities and accounting of all matters pertaining to camp maintenance, inmate wages and earnings.

(Camp maintenance and management of the messhall will be covered in subsequent articles.)

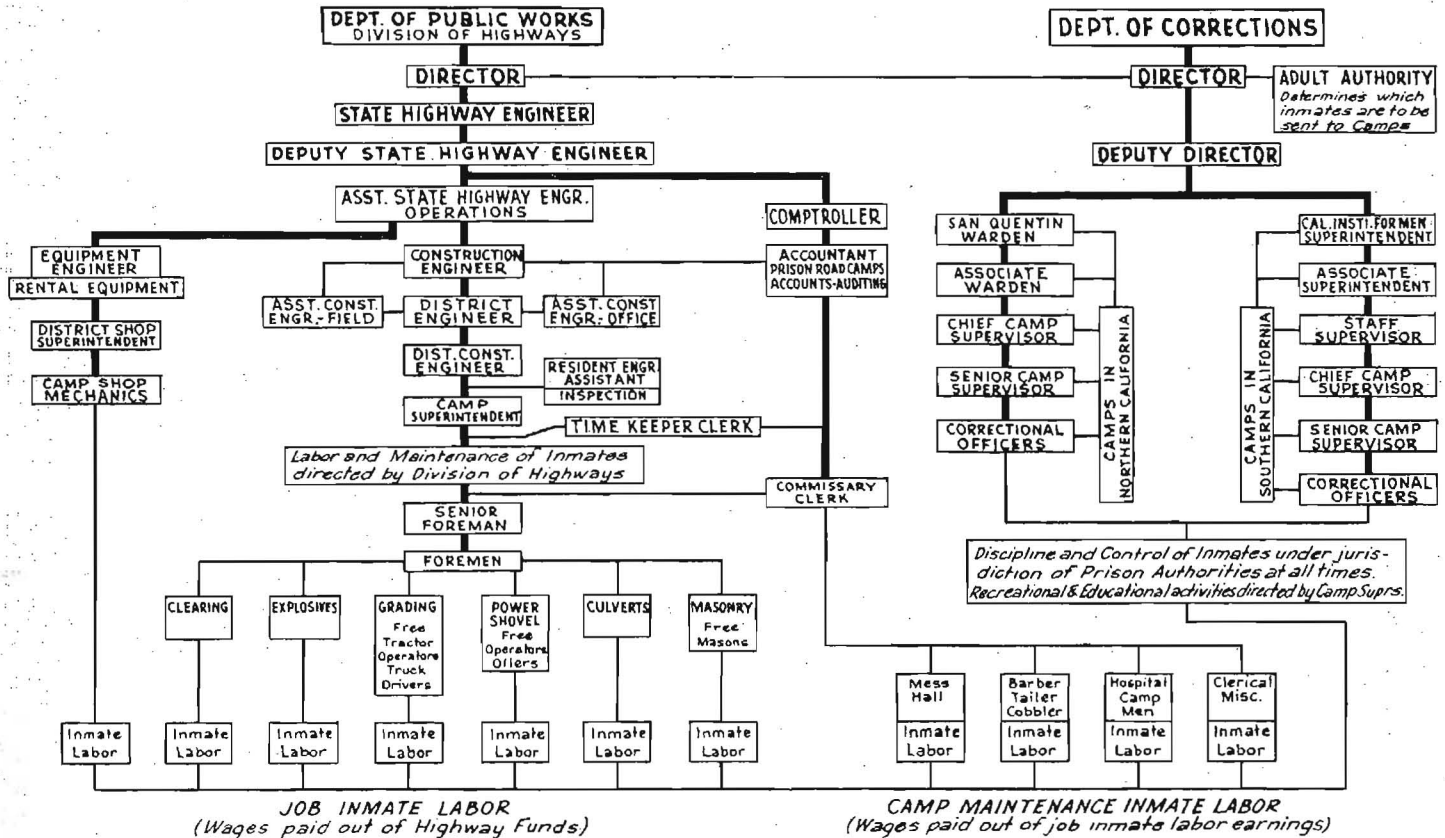
Camp Supervisors

One senior camp supervisor and two to four correctional officers, under ju-

* March-April issue of *California Highways and Public Works*.

PRISON ROAD CAMP ORGANIZATION CHART

SHOWING THE INTERRELATIONSHIP
OF THE
DEPARTMENT OF CORRECTIONS AND DIVISION OF HIGHWAYS
1949



jurisdiction of the Department of Corrections, are assigned to duty in each camp.

Duties of the senior camp supervisor and correctional officers include:

- (1) Assignment of prisoners to quarters and place at messhall tables.
- (2) Periodic inmate counts.
- (3) Direction of educational and recreational activities, including sports, moving pictures, and maintenance of a camp library.
- (4) Recording and censoring of all incoming and outgoing inmate mail.
- (5) Direction of immediate search for escapes.
- (6) General vigilance to check fraternization of prisoners with free personnel and unauthorized contact with outside parties.
- (7) Transportation of inmates outside of camp limits for medical attention in nearby towns.

(8) Acting in advisory capacity to the men in personal matters.

(9) Maintaining custody and behavior inmate records that may be required by the Department of Corrections.

Typical hard rock excavation on Feather River Canyon Highway in Plumas County in 1936



GENERAL ADMINISTRATION

Division of Highways

Administration of the prison road camps is delegated by the State Highway Engineer to the Assistant State Highway Engineer in charge of operations.

General policies concerning camp location, camp layouts, construction methods, materials, personnel, camp maintenance and commissary control, are determined or approved by the Construction Engineer.

Supervision of highway construction, and management of camp matters over which the Division of Highways has control and jurisdiction, are in the immediate charge of the District Engineer in whose district a camp is located.

Accounting of Prison Road Camp Funds

Accounting of all prison road camp activities is under the jurisdiction of the Division of Highways Comptroller.

The prison camp operating fund and the inmate's trust fund are controlled under a centralized system of accounts in the headquarters office at Sacramento. Camp books and inventory records are subject to frequent checks and audits by the Comptroller's Office.

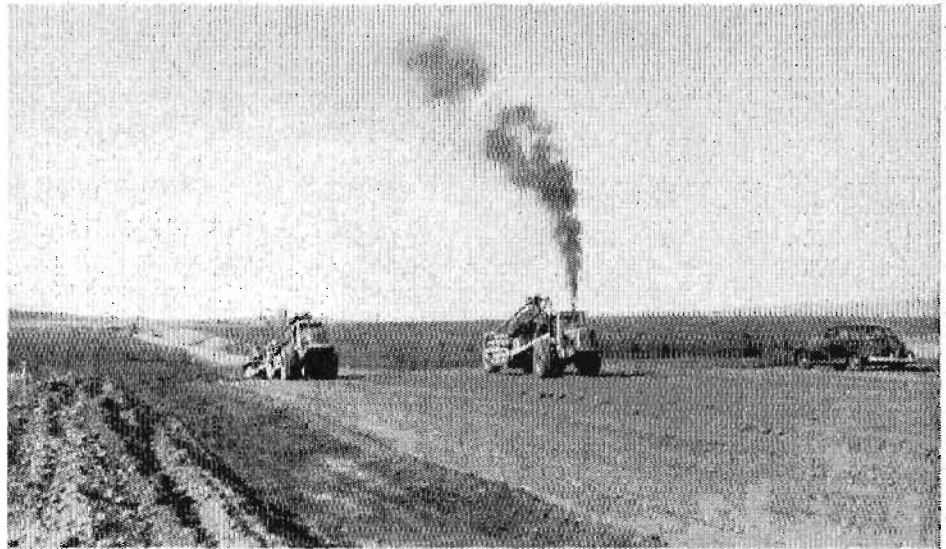
(Accounting of inmate funds will be covered in a subsequent article.)

Department of Corrections

The Warden of San Quentin Prison is responsible to the Director of Corrections for the custody, control and discipline of road camp inmates in camps in Northern California. Southern California camps are similarly under the jurisdiction of the Superintendent of the California Institution for Men near Chino.

Camp Superintendent Key Man

The camp superintendent is the key man in the prison road camp setup. His qualifications must be twofold. He must be capable of planning and executing major highway construction activities efficiently and economically. At the same time he must have an understanding of inmate labor problems and be temperamentally qualified to tactfully handle them firmly and fairly. The camp superintendent must be well



Modern earth moving equipment—tounapuls in foreground—power shovel and trucks in background. Free operators and inmate labor are working on this project in Modoc County in 1949

versed in the modern methods of feeding, housing, care and welfare of free and inmate personnel, upon which camp morale is dependent.

It is the camp superintendent's duty to establish close contact with camp supervisors and correctional officers under jurisdiction of the Department of Corrections, and endeavor to encourage and maintain harmonious cooperative relations with them.

Productiveness Equal to Free Labor

Assuming properly selected prisoners and camp conditions conducive to good morale, the productiveness of inmate labor has over the years been found to be comparable to that of free labor.

The third article in this series, covering road camp layouts, will appear in the next issue of "California Highways and Public Works."—Editor.

KONINKLIJKE NEDERLANDSCHE TOERISTENBOND

Royal Dutch Touring Club
Royal Touring Club des Pays-Bas
Koniglich-Niederlandischer Touring Club

THE HAGUE
LA HAYE
DEN HAAG

*California Highways and
Public Works*

P.O. Box 1499
Sacramento, California

DEAR SIR: AS we take very much interest in your publication, *California Highways and Public Works*, we should be very pleased if you would send us the volumes for 1948 and henceforward send the magazine regularly.

We shall be very grateful to hear from you regarding this and remain meanwhile,

Yours very truly,

KONINKL. NEDERL.
TOERISTENBOND A. N. W. B.

THE SAME TO YOU

PUBLIC WORKS
310 East 45th Street
NEW YORK, N. Y.

MR. KENNETH C. ADAMS, *Editor*
*California Highways and
Public Works*
P.O. Box 1499, Sacramento, Cal.

DEAR MR. ADAMS: We have received the March-April issue of *California Highways* and find in it an unusual number of articles of general interest to highway men. I know of no publication by a state highway department that approaches it in value to engineers of the matter published.

I always find articles that I take the liberty of abstracting for our *Highway Digest*, and many that I would like to publish entire if space permitted.

With compliments and best wishes,

A. PRESCOTT FOLWELL
Editor

New Crossing

Steel Bridge Across Navarro River Replaces Timber Span

By HARRY T. CARTER, Senior Bridge Engineer

Now NEARING completion, the bridge across the Navarro River on State Sign Route 1, about four miles south of Albion, Mendocino County, will replace the old timber truss bridge which is posted for a loading of 11 tons and a speed limit of 15 miles per hour. The location of the new structure, approxi-

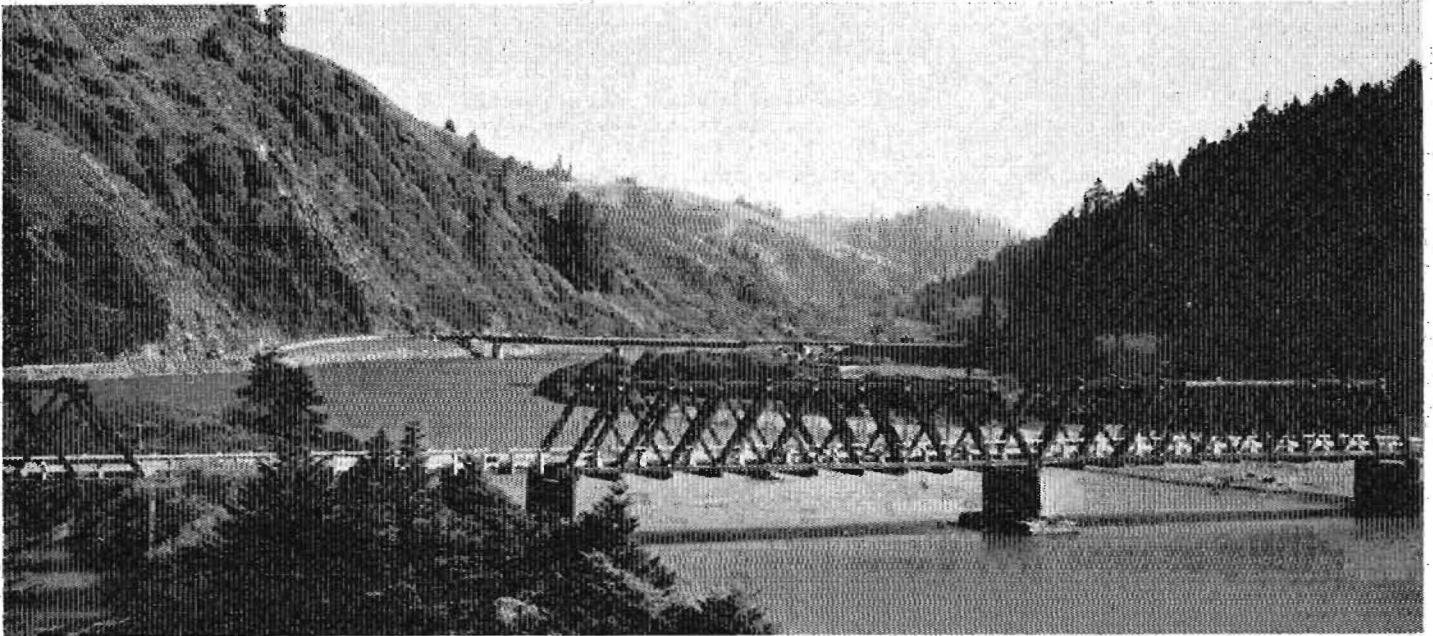
mately a third of a mile upstream from the old bridge, provides for future development of the coastline highway as it approaches the river. The existing hillside approaches are narrow and on steep grades.

During the winter of 1913-1914 the original trusses of the old bridge were

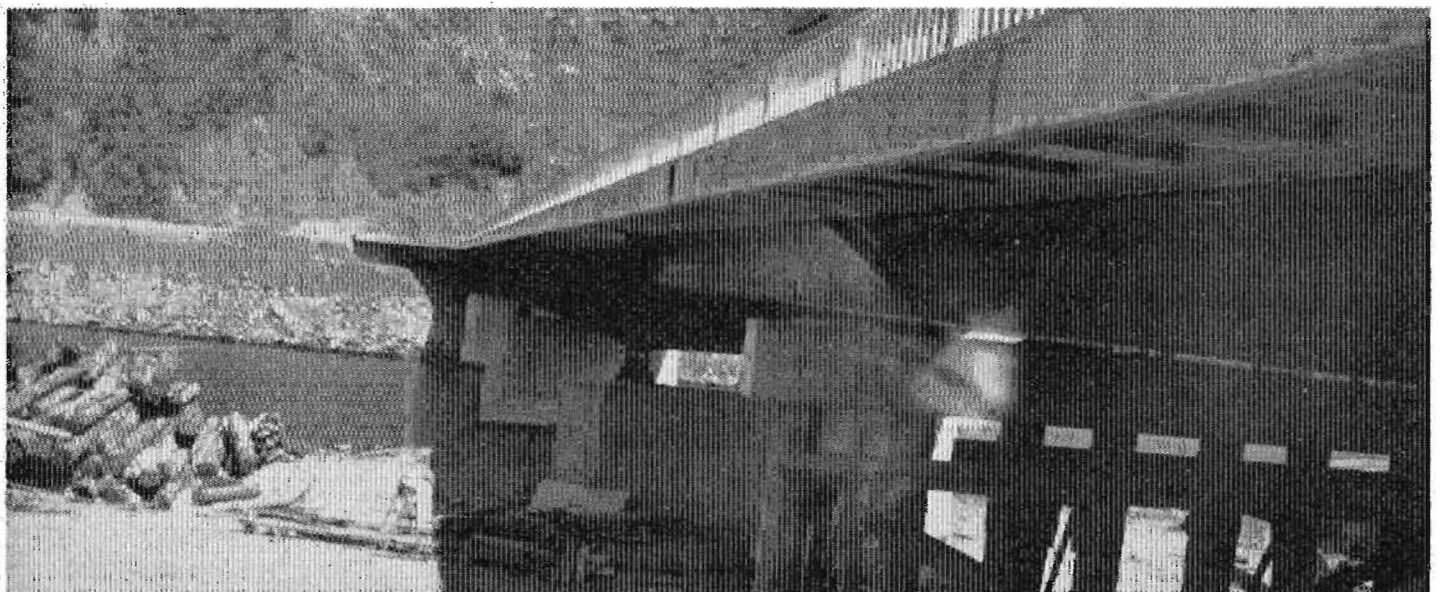
floated off the piers and destroyed by high water.

The new bridge, high enough to give adequate clearance above estimated high water, is a deck type plate girder with three stringer approach spans; the two main spans are 144 feet each. Road-

... Continued on page 59



UPPER—Old Navarro River Bridge with new span in background. LOWER—Close-up of new structure



CALIFORNIA LEADS ALL WEST IN TRAFFIC ENGINEERING

FOR OUTSTANDING performance in traffic engineering during 1948, California leads the 11 western states, the Institute of Traffic Engineers informed Governor Earl Warren on April 20th. Utah won second place.

For cities of 50,000 to 100,000 population, Fresno was awarded the second place in traffic engineering achievement.

Last year California received honorable mention and a suitable plaque was presented to Governor Warren, who handed it over to Director of Public Works C. H. Purcell and State Highway Engineer George T. McCoy.

On May 19th, F. B. Crandall, Traffic Engineer of the Oregon State Highway Department and a director of the Institute of Traffic Engineers, presented this year's award to Governor Warren, who, following precedent, gave it to Director Purcell and State Highway Engineer McCoy.

This year's award was based on a report by the Governor's Coordinating Committee on Safety, which was a part of the Governor's overall safety program. This committee is composed of the chiefs of eight state departments with Clifford E. Peterson, Commissioner of the California Highway Patrol, as chairman. Other members in

addition to Peterson and Purcell are Roy E. Simpson, Superintendent of Public Instruction, James S. Dean, Director of Finance, A. H. Henderson, Director of Motor Vehicles, Carl Holton, Director of California Youth Authority, Paul Sharrenberg, Director of Industrial Relations, and Judge Paul Schottkey, Judicial Counsel.

All 48 states and 570 cities participated in the contest, the results of which were determined by the Traffic Engineering section of the Annual Inventory of Traffic Safety Activities, formerly known as the National

... Continued on page 59

Governor Warren receives plaque awarded to California by the Institute of Traffic Engineers. Left to right: F. B. Crandall, Oregon State Highway Department and a director of the Institute of Traffic Engineering; Director of Public Works C. H. Purcell, Governor Warren, J. W. Vickrey, Assistant State Highway Engineer; George T. McCoy, State Highway Engineer, and J. C. Young, Traffic Engineer, California Division of Highways



Bridge Program

Los Angeles County Making
Good Use of FAS Funds

By FREDRIC HOKIN, Resident Engineer

(This is a federal aid secondary county road project. The engineering was done by county forces.)

UNDER THE provisions of the Federal Aid Highway Act of 1944 and the County Highway Aid Act of 1945, Los Angeles County was apportioned \$2,610,683 in FAS and state matching funds. To obligate these funds, Los Angeles County submitted programs providing for the construction of seven bridges located principally in the southwesterly portion of the county, having a total estimated cost of \$3,200,000. The county proposed to augment its FAS and state matching funds with approximately \$600,000 of county funds.

At the present time, three bridge contracts are under way or completed, and the contract for an additional bridge will shortly be awarded.

The first bridge completed under the Federal Aid Highway Act is over the Los Angeles River on Florence Avenue. It is a reinforced concrete multiple span structure with a 48-foot clear roadway.

Major Traffic Artery

Florence Avenue on FAS Route 838 is a connecting link between State Route 167, Atlantic Boulevard, and farming, residential and industrial areas to the east. Another bridge on Florence Avenue, over the San Gabriel River, is on the future construction program,

and a third, over the Rio Hondo, is to be replaced, which will make this route a major traffic artery for the area.

The old bridge at this site was, for a number of reasons, unsatisfactory. It had a deck elevation 8 to 10 feet above the river bed, and had been partially washed out in the 1938 flood. The levee walls were some ten feet higher, so that the bridge actually cut through the levees, and provisions existed for closing the road and blocking the gaps in the levees in the event of flood, to prevent inundation of surrounding territory.

The eleven 38-foot A-frame spans supported a 19-foot roadway on wooden planking, and offered the double hazard of fire and of blocking the river channel. Maintenance costs were high and extensive repairs would have been necessary at the time of replacement.

Service Roads Provided

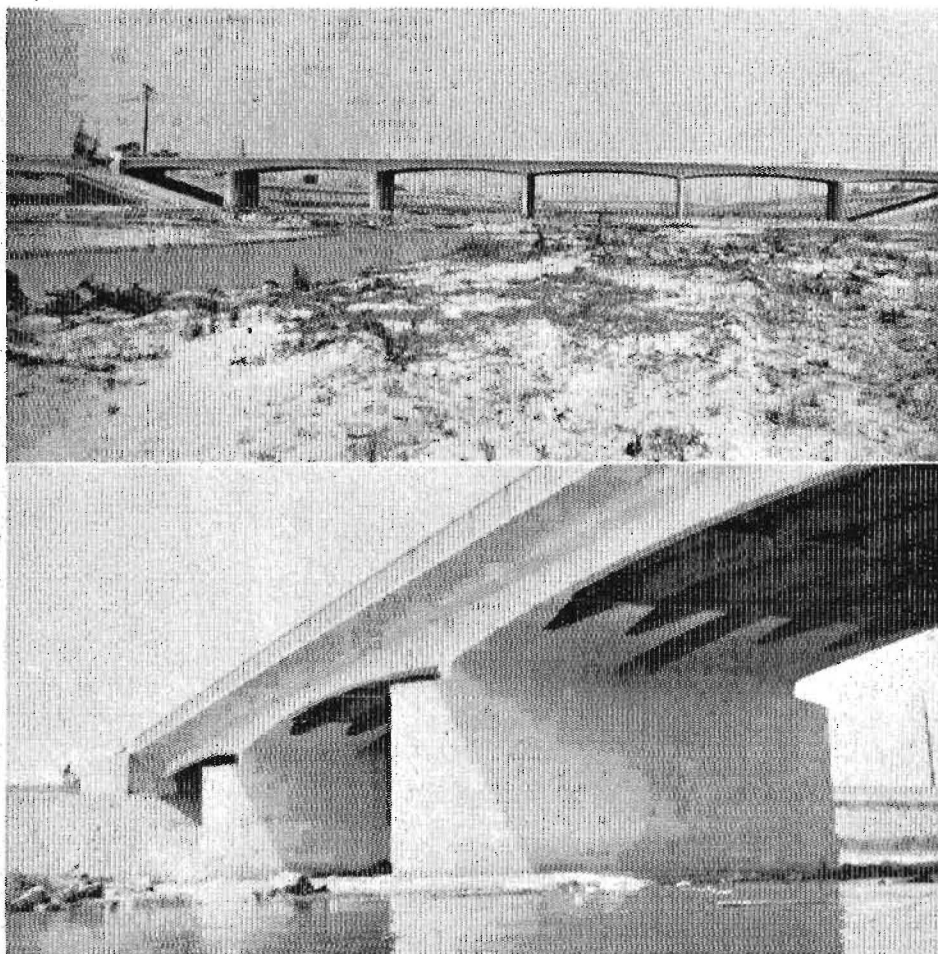
The new bridge, consisting of four 83-foot spans and end spans of 63.37 feet, forms the top of a vertical curve shaped for adequate sight distance. Deck elevation is 18 to 20 feet higher than on the old bridge, so that bottoms of the inverted T-beam girders, at the piers, are on a level with the tops of the levee walls.

Service roads are provided on both sides of the ramps, to provide access to adjacent property and connections to previously intersecting roads in the vicinity of the bridge.

Piers for the bridge are thin and solid, with stream-lined nose and tail, and are designed to permit maximum flexibility with temperature changes, there being no expansion joints in the 460-foot length of deck.

Since the design of the bridge is a combination of box girder section, inverted T-beam, and open T-beam in each span, with cantilevered sidewalks, provision was made for a utility duct through the center of the bridge, in the space between the two inner gird-

Two views of Florence Avenue bridge across Los Angeles River constructed with FAS funds



... Continued on page 59

Huge Job

*Right of Way Clearance in the
Los Angeles Metropolitan Area*

By ROBERT A. SPOONER, District VII Right of Way Agent

WITHIN the coming 10-year period, the Division of Highways will complete construction of approximately one hundred miles of freeway in Los Angeles, providing a veritable network completely covering the metropolitan area and leading out into the rural districts in every direction. (Previous articles in this magazine have given complete information on engineering features, structures, alignment and mileages of the freeway system.)

The once sprawling Mexican pueblo has expanded to a point where it covers more area than any other city in the United States and is now the Nation's third most populated city. Unfortunately, however, during the last two decades lack of finances has prevented the highway engineers from keeping pace with the huge increase in population and motor vehicles, with the result that the present traffic snarl is strangling the very economic life of Los Angeles.

Right of Way Problems

A glance by the casual observer would lead to the conclusion that the problem of planning freeways through this highly developed and widely spread area would be impossible, but our highway engineers, visualizing the situation through their trained eyes, have overcome problems that at first seemed unsurmountable. The freeway system for Los Angeles is a living thing, accompanied by the necessity for the California State Highway Right of Way Department to adapt itself to the most voluminous and difficult problem with which it has ever been confronted.

The purchase of every conceivable type of real estate holding and the later removal of stores, homes, apartment houses, manufacturing plants, and all other types of structures to clear the right of way so that construction may proceed in an orderly manner, and at the same time accomplish the job with a minimum of inconvenience to the af-

ected occupants, staggers the imagination. The problem multiplies many fold when the task of relocations of the tremendous number of affected people residing in residential buildings in the right of way area is considered.

Mass Relocation

Within the next five years the planned program necessitates that 3,400 buildings and nearly seventeen thousand people will be moved in order to permit construction to be carried on. This, however, will be an orderly and gradual process. The great majority of residence buildings will be moved and rehabilitated at new locations, and because of modern building and safety requirements will, in their new locations, be superior in appearance and utility than they are at present, and every possible step will continue to be taken to cause as little inconvenience as possible to the affected people.

Little does the average citizen realize that the entire area for the huge four-level structure, which is the termini and distribution point for the Hollywood Freeway, the Santa Ana Freeway, the Harbor Freeway and the Arroyo Seco Parkway, and located between Sunset Boulevard, Temple Street, North Figueroa Street and Beaudry Avenue, has been cleared and that this huge freeway structure is nearly completed. This area was formerly a solidly built up and populated downtown area of the City of Los Angeles.

Huge Area Cleared

The area for the extension of the Arroyo Seco Parkway southerly to the termini of the four-level structure has been cleared. The area for construction of the Santa Ana Freeway has been cleared from the four-level structure easterly through the civic center area to Alameda Street and right of way from the Aliso Street Viaduct southerly and easterly has been cleared and construction completed to a point

beyond the easterly city limits of Los Angeles. There remain only several buildings and a handful of people to complete right of way clearance southeasterly to State Highway Route 167 (Atlantic Boulevard), several miles beyond the Los Angeles city limits.

The entire area for the Hollywood Freeway, extending westerly from the four-level structure through the heart of a solidly built up area in Western Avenue has been almost completely cleared. From Western Avenue westerly to a junction with the already completed section of the Hollywood Freeway (extending through Cahuenga Pass westerly from Highland Avenue), clearance is now being carried on in an orderly and gradual manner.

Many Residents Moved

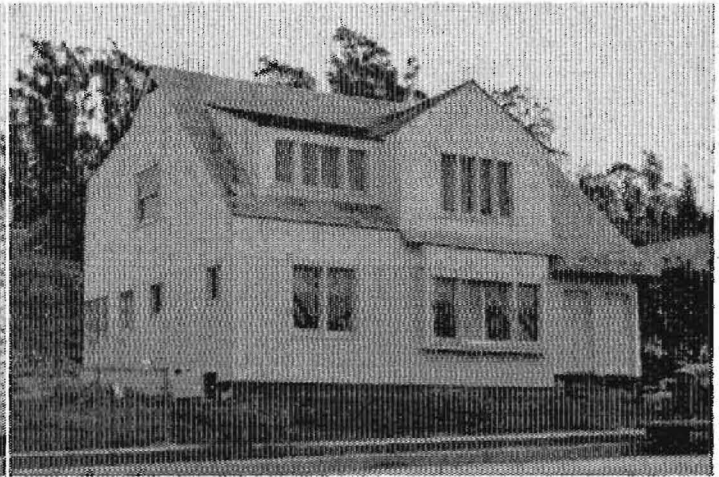
The path on which this freeway right of way clearance program is being carried on runs through almost solidly built up districts with few pieces of vacant ground to be found. The clearing of right of way from the four-level structure to Highland Avenue, a distance of approximately seven miles, includes the moving of approximately 1,550 residence buildings, 1,100 of which have been removed from the right of way, 100 of the remainder have been sold back into private ownership and are in the process of being moved. The remaining 350 buildings at the westerly end of the freeway will be sold and removed as it becomes necessary to clear the area for construction.

Because of the still existing housing shortage in the Los Angeles metropolitan area and to properly protect the affected people, every residence building is permitted to remain in place as long as possible.

It takes many more months to build grade separation structures than to build the roadway. For this reason only a limited number of buildings are cleared from the right of way to per-



BEFORE—This typical old, two-story building was located at 1422 Bellevue in the right of way of the Hollywood Freeway.



AFTER—This structure is now located at 2486 Silverlake Boulevard. The modernization of this building was quite expensive.



BEFORE—The old-fashioned structure pictured above was formerly located at 439 North Belmont Street. It was removed to allow construction of the Hollywood Freeway.



AFTER—This building is now located at 226 North Westlake in Los Angeles. A slight change in the porch and the new paint job give the residence a much more pleasing look.



BEFORE—This building was located at 5107 Edmund Street in Los Angeles and was removed for the construction of the Hollywood Parkway.



AFTER—The relocated building now stands at the northwest corner of Fourth Street and Serrano. It has been changed so as to be hardly recognizable.

mit the contractors to build the structures first. At a later date, as right of way area is required, buildings are removed to permit roadway construction to proceed.

The methods used in clearing the right of way, after the buildings have been purchased by the State of California, are relatively new. These methods were developed in order to protect the tenants in buildings affected by the freeway.

The steps taken by the Right of Way Department are briefly as follows: The length of area to be cleared within the right of way is determined by advice from the Construction Department as to how fast construction will progress. The agents having found which area will be affected, view the improvements at their present site and place a sale value on them, and find out by careful investigation just what the tenant problem will be. This value includes a "minimum value," a "vacant" value, and a "tenant occupied" value, depending on the tenant problem.

The State, after extensive publicity, sells the improvements at public auction. The "minimum" value represents the lowest bid which will be accepted. The "vacant" value is the value which the State estimates the improvements will sell for at public auction, provided the building is vacant. The "tenant-occupied" value is the price which the State estimates the building will sell for with tenants residing in the building for whom the successful bidder will have to provide future housing.

The "tenant-occupied" building illustrates how the State has planned for clearing procedure with the tenant as the prime consideration. If, of course, the tenant is physically and financially capable of providing other housing facilities, he must solve his own future housing problem. However, in all cases where such action is justified because of inability to secure other housing facilities, lack of finances, physical disability, etc., or the occupant is a veteran, the building is considered to be tenant occupied. The expression "tenant occupied" means that the tenant in the building affected will be assured of certain benefits as stated in the terms of sale.

During the period of World War II, and in accordance with war-time rec-

ommendations, new construction activities, came to an almost complete standstill. During all of this period the Division of Highways was proceeding with plans and the acquisition of right of way looking toward an all-out program of freeway construction as a contribution toward the solution of the critical traffic problem in the Los Angeles metropolitan area.

However, immediately upon termination of hostilities, when the Division of Highways was ready to proceed with the clearance of right of way, it became apparent that because of the still remaining critical housing shortage tenants living in the residential buildings within the right of way area could not find other housing facilities of a reasonable comparable nature to which to move, and those who had sold their homes to the State and were still residing in them on a tenant basis could not find new homes to purchase and move into.

The result was that several freeway eviction committees—some well intended and well guided, others with ulterior motives—came into existence and at that time a policy was laid down by our superiors to the effect that, even though freeway construction was critically needed, the Division of Highways would not evict any residence tenant until it was established that he had a reasonable, comparable place to move, even though such policy would make it necessary to delay the freeway construction program.

The Division of Highways, recognizing its moral responsibility to the families living in state-owned residential buildings, immediately initiated a procedure under which residential buildings where necessary would be sold "tenant occupied." The printed proposal for the sale of the building at public auction provides that the successful bidder is required to take care of the tenant or tenants in possession and to guarantee that the tenants' rights will be protected by posting a \$1,000 faithful performance bond for each affected family.

Three-way Agreement

The provisions of this three-way agreement are outlined elsewhere in this article are briefly:

(a) Tenant must be provided six months continuous occupancy in the residence at

its new location after completion of rehabilitation work.

(b) Where necessary tenant must be provided temporary housing of a comparable nature and his personal property taken care of during the relocation and rehabilitation period all at the expense of the purchaser.

(c) Building can not be moved more than four miles from its present location without the consent of the tenant or tenants.

(d) By mutual consent of all parties, purchaser may make arrangements for other housing facilities for the tenant.

(e) Purchaser may, subject to the approval of the Division of Highways, negotiate with the tenant and purchase his continued occupancy rights.

Fortunately, due to the extensive new residential construction now taking place in the Southern California area, the housing situation is rapidly improving. This is borne out by a check of our records which show the continually increasing number of tenants selling out their "tenant rights."

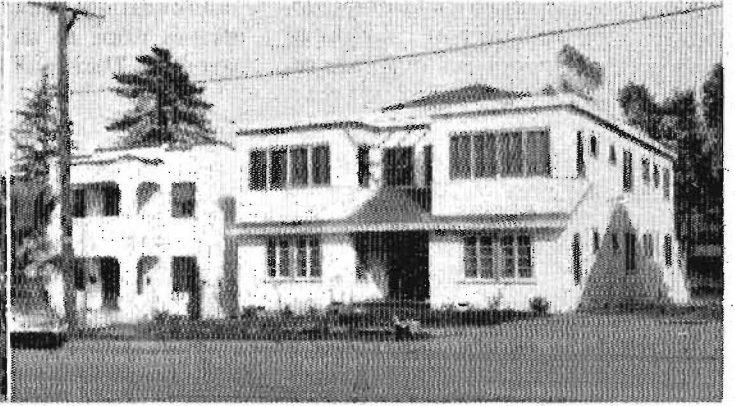
With these facts as a guide and supplementary conversation with the tenants, we have arrived at the conclusion that "state tenants" are more and more able to find new housing accommodations on their own. Keeping this in mind, it is anticipated that the Division of Highways will be able to discontinue the practice of selling dwellings "tenant occupied" in the near future. This is, of course, contingent upon the actual ease and ability of tenants to secure new housing.

Buyer's Responsibility

The buyer or new owner at the time of sale is required to supply the tenant with six months' continuous housing. This housing may be in a comparable house or in the same house after it is relocated. If the tenant is to move back into the original dwelling, he must be supplied by the purchaser with temporary housing until such time as the moved dwelling is ready for occupancy for the agreed six months' period. If it seems more feasible, the purchaser may by mutual agreement supply the tenant with a comparable dwelling, rather than move him into the relocated structure. In either event, the tenant may not be moved more than four miles from the original site without his consent. This is another



BEFORE—The large, old-fashioned two-story building pictured above was located at 433-437 North Beaudry in the right of way of the freeway and required considerable remodeling to retain attractiveness.



AFTER—This residence is now situated at 1015 West Kensington Road. It has been completely modernized inside and out. The roof line has been changed, lower porches remodeled, and the exterior stuccoed.



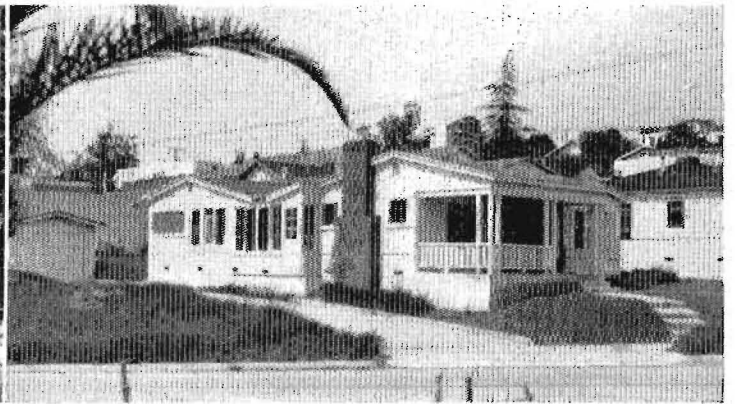
BEFORE—This large old building was moved from the downtown Los Angeles portion of the freeway. Its original address was 470 Centennial Street.



AFTER—The building is now located at 1647 West 12th Place. The porches were remodeled in order to give the building a more modern look.



BEFORE—This single-story residence, which was situated at 721 North Alexandria, is typical of its age. It was formerly in the right of way for the parkway.



AFTER—This residence is now located at 717 Tulerosa. The eaves have been cut, the porch remodeled, and the entire building redecorated.

precaution taken by the Division of Highways to protect the people affected by clearing for the freeway and insures the tenant of remaining in the same general neighborhood and near his work and other interests.

The tenant may, at his own option, waive his tenant rights for a stipulated sum of money. The successful bidder and the tenant reach this sum by negotiation. The cost to the buyer to relocate the tenant, and the advantage to the buyer to have immediate possession of a vacant house, are important factors in reaching this settlement. On the other hand, the tenant may wish to take the chance of finding another dwelling of his own choice.

Our records show that a great percentage of tenants desire to waive their rights for a nominal sum of money. The average sum which a tenant accepts for this act is well under \$250. Our records also indicate that approximately 90 percent of the tenants have waived their right of six months' continued housing. Approximately 5 percent have moved into a comparable house, and the remaining 5 percent were relocated in the original house after it had been moved.

When a house is sold "tenant occupied," it is not a foregone conclusion. Many factors must be weighed. First and foremost is, can the house be moved? The house has a very limited value, merely salvage of materials, if it cannot be moved. In an area where the houses are of fairly modern construction and of such size as to be easily moved, we have little difficulty in selling the "tenant occupied," as they have considerable value in a new rehabilitated location.

Three Types of Buildings

In contrast to the area in which the houses are easily moved, we have small slum areas and apartment house districts and a few sections containing large homes of the mansion class where the buildings are very difficult or impossible to move. These fall into three general groups: First, the very large home or mansion which it is not possible to move without excessive expense, due to its size; second, the slum type house which would not stand moving, nor would the Department of Building and Safety of the city allow it to be placed elsewhere, nor is it of sufficient

value to allow it to carry the "tenant burden;" third, the large apartment building that it is impracticable to attempt to move. In these cases the building must be sold vacant and the buyer will wreck it for the materials contained.

The tenant problem in the case of the large expensive home is negligible. These people are able to relocate themselves without aid from the Division of Highways. The tenants in the slum type houses are the most serious problem we have to face. These houses cannot be sold "tenant occupied" because of their very low value. The people living in them are aided in two ways. Through the cooperation of the city, county and Federal Housing Authority, we are sometimes able to place them in housing units. The remaining tenants are taken care of by moving them to other state-owned houses which are not presently in the path of construction. There is at present little difficulty in finding comparable apartment units. In this way the Division of Highways is able to clear the right of way of all buildings and to see that all tenants are taken care of.

Special Cases

The old age pensioners, public welfare cases, physical disability cases and the veterans are given first consideration in the problem of relocation. An example of the efforts taken by the right of way agents in finding suitable housing for people in this classification shows the untiring work by this department in such cases.

An elderly lady, a semi-invalid pensioner, was living in a brick apartment house which was located within the Santa Monica Boulevard Bridge site on the Hollywood Freeway. The building had to be removed from the right of way in order to construct the bridge. As the building could not be relocated due to its brick construction, it could not be sold with "tenant benefits."

One of the right of way agents was assigned to aid and assist this elderly lady in finding just the housing accommodation which she needed. The agent consulted with her family and the Public Housing Authority, as well as with the lady involved. It was found that, due to her condition, she must have a small apartment in the Hollywood area, near a shopping center and public

transportation. The rent had to be very low, as she was living on her pension with some help from her family. Just such an apartment was found after a month of almost constant search. There are many cases of this nature in the right of way clearing program. This one illustrates the care and preparation that must be made in order to protect the tenant and keep the program moving with as little inconvenience to them as possible.

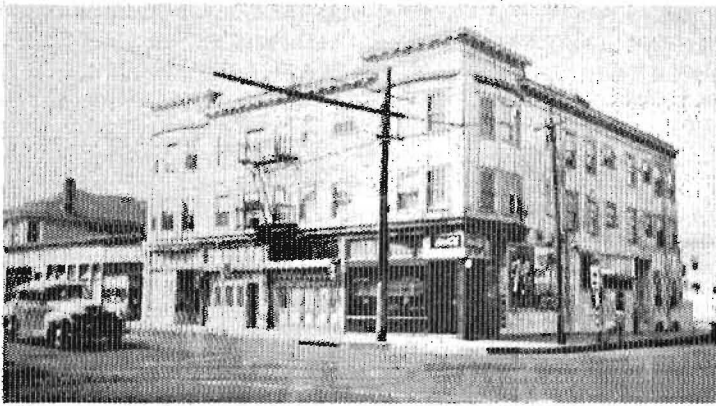
Santa Ana Freeway

Along the Santa Ana Freeway, extending easterly from the four-level structure at approximately Figueroa Street to Broadway, the problem of right of way clearance presented almost unsurmountable obstacles. In this area were located some of the oldest multiple dwelling and apartment house buildings in the metropolitan area of Los Angeles. Proper maintenance of the buildings had been neglected for many years. The buildings and occupants represented a maximum slum problem with numerous county welfare cases in occupancy, as well as many foreign born people who were financially unable to assist themselves.

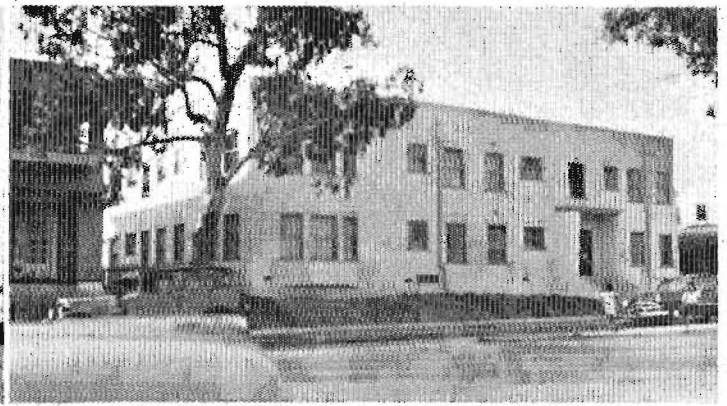
It is, therefore, obvious that this portion of the right of way area presented a problem requiring the maximum of patience and consideration on the part of the state's representatives. Fortunately, however, with excellent cooperation from the Freeway Right of Way Clearance Committee appointed by Mayor Fletcher Bowran of Los Angeles, at the request of state highway officials and with full cooperation from city, county and federal housing authorities, county welfare officials and representatives of the hotel and apartment house owner groups, every family, involving over 1,200 persons, was moved out without a single person being legally evicted.

The portion of the Santa Ana Freeway extending southeasterly from the Aliso Street Viaduct to its present temporary terminus at Eastman Avenue, where construction has been completed, and also along the already acquired right of way area from this point to Atlantic Boulevard has presented its share of problems.

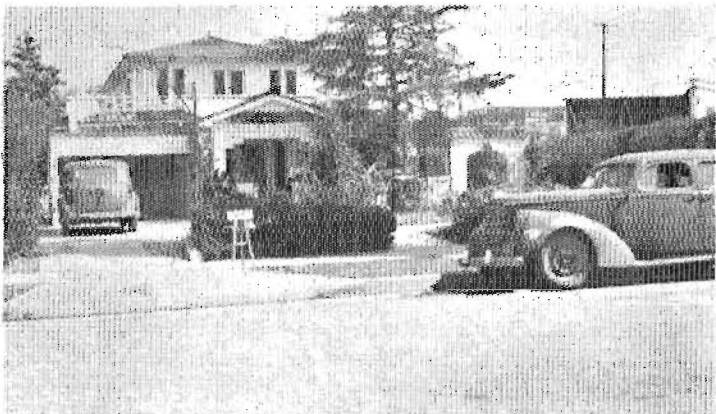
Running southerly from Aliso Street to Seventh Street, the freeway alignment traveled through the very solidly



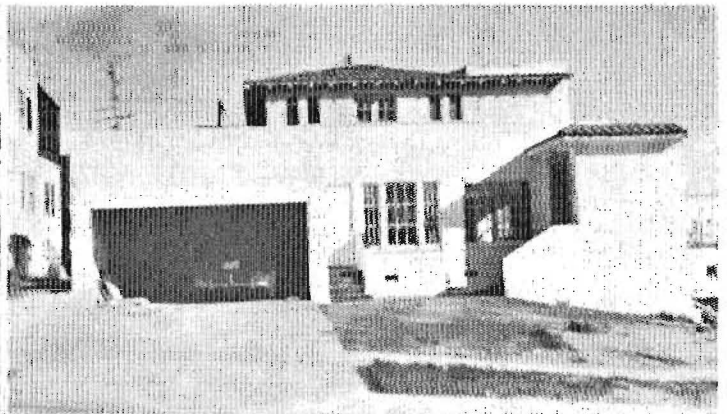
BEFORE—This three-story building with apartments above and stores below was located at 107 North Fremont Street. It was removed for the construction of the First Street bridge site on the Harbor Freeway.



AFTER—This is the same building as it looks today, located at 209 North Boylston Street outside of the freeway limits. The stores were removed from underneath, the two upper stories were cut vertically into two sections and lowered to the ground.



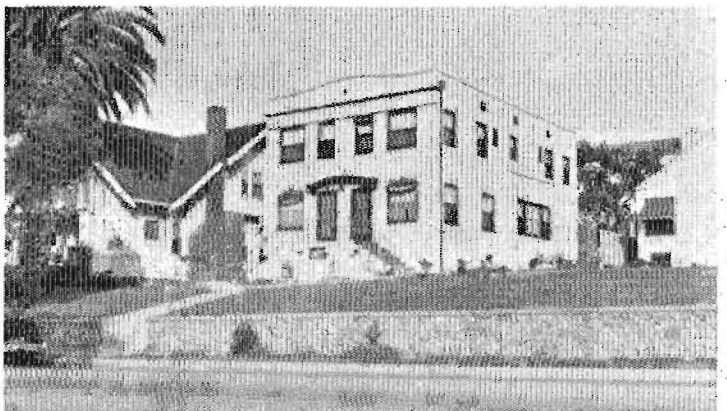
BEFORE—The two-story building pictured above was located at 706-708 Mariposa in the right of way of the freeway. It was desired to modernize this structure.



AFTER—The same building after it was moved to 2010-2014 Longwood in Los Angeles. The front porch was removed and the entire building was given more modern lines.



BEFORE—This large two-story duplex was located at 4219 Clinton in the right of way of the freeway. Its removal presented architectural problems.



AFTER—The building was moved to 654 North Parkman and its original architecture retained with a slight change in the front porch.

built up old-time Russian settlement. However, this group of people were found most cooperative, and in most cases owned their own property, and the compensation that was paid in the purchase enabled them to acquire other housing facilities in which they have rehabilitated themselves.

Traveling southerly and easterly from Seventh Street for a distance of approximately 1½ miles, and especially in the area immediately east of Soto Street, difficult problems similar to those between the civic center and the four-level structure were faced, but they were fewer in number, and even though some of the Mexican families were living in hovels constructed of the remnants of packing boxes, again with the cooperation of public housing agencies, every family was taken care of.

Right of way clearance is presently being carried on from Eastman Avenue across Olympic Boulevard and southeasterly to Atlantic Boulevard. Approximately 800 residence buildings originally were located within the right of way area between Aliso Street and Atlantic Boulevard; 735 have been removed, 20 are presently in the process of being moved, and the remaining 45 will be disposed of and moved from the right of way area within the near future. Within this area a total of 1,354 families, consisting of slightly over 4,678 people, have been moved and rehabilitated without undue hardship to a single person and without a single legal eviction.

In the case of those residence buildings that were incapable of removal and rehabilitation, the tenants in possession were taken care of by placing them in Housing Authority trailer-court units, which housing facilities, incidentally, are far superior to those they were occupying.

Those who owned the residential buildings, of course, were in a position to purchase or build a new home with the money they received from the sale of their property to the State; in some cases, a transaction was arranged in which the owner was permitted to repurchase the residence building from the State, move it to a new lot outside of the right of way area and rehabilitate the building for future occupancy at the new location. In a few cases,

where there was no other solution, tenants in possession were moved to other state-owned residential units that would not have to be cleared from the right of way for an additional period of seven months to a year.

There were also some cases where buildings were sold "tenant occupied" and removed with the "tenant benefits" clause included in the terms of the sale.

Within the right of way area of the Santa Ana Freeway, from Atlantic Boulevard to the City of Santa Ana, the freeway traverses principally rural area. Approximately 200 dwellings are estimated to lie within these bounds in a distance of about 24 miles. Very little difficulty, however, is anticipated in taking care of the tenant problem, for in practically all cases the buildings are capable of being moved and rehabilitated with ample vacant land available in the immediate vicinity of their present location.

In Santa Ana

As the freeway swings around the northerly and easterly side of the City of Santa Ana, from Main Street to First Street, the homes affected are for the most part middle class which can easily be moved. Fortunately, in some cases, there is ample room on the remaining portion of the owner's property or ample available vacant lots in the near vicinity on which the buildings can be moved and rehabilitated. In this two-mile stretch 55 homes will be affected, 12 of which have been removed. Three are in the process of being moved, while 40 remain to be cleared from the right of way.

The extension of the Arroyo Seco Parkway from its present temporary terminus at Adobe Street to the four-level structure, a distance of approximately one-half mile, represented a difficult problem. There were approximately 65 residential dwellings occupied by 73 families, and a total of 293 people affected. The dwellings in this area were very old, and for the most part of poor construction and incapable of being moved and rehabilitated. Few of them could be sold "tenant occupied," as the cost of moving and rehabilitating the building, plus the cost of caring for the tenants, was too great in comparison to the value of the building rehabilitated at a new location.

In all cases where families were not physically and financially able to rehabilitate themselves, they were given full cooperation and guidance by representatives of the Right of Way Department. The result was that the relocation of tenants was carried on in a very satisfactory and adequate manner without unnecessary or undue pressure being placed upon them and without a single legal eviction.

The records of the District VII Right of Way Department show that approximately eighty-eight of the residence buildings located within the freeway right of way that has been cleared to date have been or are being moved to new locations and after rehabilitation will continue in occupancy indefinitely, with the result that the program of right of way clearance cannot be considered as a contributing factor to the housing shortage that has been in existence since the early 1940's in this area.

The great difficulties, the turmoil and confusion resulting from clearing the right of way for freeway construction through this solidly built up area which were originally prophesied and anticipated have been almost completely overcome. The success of these operations will allow the people of the State of California, and especially those living in the Los Angeles metropolitan area, to have many miles of freeway facilities carrying them safely, rapidly and with peace of mind through the metropolitan area a number of years sooner than was originally expected.

Summation

A summation of right of way clearance since the commencement of operations shortly before the end of the war to date is as follows:

Santa Ana Freeway:	1,354 families consisting of over 4,678 people moved and rehabilitated.
Hollywood Freeway:	3,700 families consisting of approximately 12,000 people. Note: These people have been moved from the area between Alameda Street near the Los Angeles Union Depot and Gower Street in Hollywood.
Harbor Parkway:	130 families, consisting of approximately 450 people, moved. Temple Street to Second Street.
Harbor Parkway:	Second Street to Olympic Boulevard right of way clearance is in process as far south as Seventh Street. The buildings are mostly multiple dwellings and small hotels. 1,700 families, consisting of approximately 3,500 people, are affected. Approximately 45 percent of these people will have moved from the right of way area by the first of August.

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POWWOW

Western Chapter National Shade
Tree Conference Meets in Capital

THE STATE DIVISION OF HIGHWAYS was well represented at the sixteenth annual meeting of the Western Chapter of the National Shade Tree Conference held in Sacramento May 25th through the 28th, with President Horace N. Bosworth, Associate Landscape Architect, Headquarters, Maintenance, wielding the gavel.

Of an attendance of 160, the Division of Highways was represented by four associate landscape architects, two assistant landscape architects, 11 highway tree foremen, and 1 supervising groundsman, a total of 18.

In addition to the highway representatives, the conference was attended by commercial and other governmental arborists, landscape gardeners and architects, scientists, park superintendents, foresters and commercial manufacturers.

A comprehensive program was arranged by E. S. Whitaker, Associate Landscape Architect, Highways Maintenance, Sacramento, which kept the delegates aware throughout the conference of the depth and variety of subjects which are related to their work. A. J. Bellue, highway tree foreman, District III, very ably managed exhibits of tools, equipment and supplies for the conference.

Dennis Speaks

Guest of honor and speaker at the opening luncheon on Wednesday, May 25th, was T. H. Dennis, Highway Maintenance Engineer, who described the history of landscaping along California's highways since 1912, when many county roads were taken over by the State. Maintenance was accepted in 1917, and in 1919 a nursery was started near Davis where trees were grown for highway use. By 1927 3,000 miles of roadsides had been planted to trees. These were on 60-foot rights of way, which were later extended to 90 or 200 feet, thus destroying many of the early plantings. Roadsides are now planted according to a practical need; that is, for erosion con-

trol or fire hazard control, or to outline a subway, bridge or other highway structure, or to control hazardous lighting conditions. Trees are planted in groups instead of monotonous rows. There are now laws to protect against mutilation of trees or plantings. Last



Horace N. Bosworth

year the division expended \$711,000 for trees, shrubs, and their maintenance and other growth control along its roadsides.

Donald P. Van Riper, Senior Landscape Architect, Division of Architecture, as guest speaker on Thursday, May 26th, told the group that we sometimes work so closely to trees that we forget why we have them. The general pattern they afford is important in their proper use: "See the forest first, then start examining the trees." There is no perfect tree, but we must use trees first in landscape design.

Origin of California Trees

Prof. Howard E. McMinn, Department of Botany, Mills College, Oakland, addressed the group on "The Origin of Some California Trees," at

the Friday luncheon. He is an experienced horticultural speaker and gave a dynamic and interesting address on the distribution of plant species.

The conference program included papers and discussion on the subject: "An Explanation of Plant Breeding," with Prof. Woodbridge Metcalf, Extension Forester, University of California, as chairman and Dr. Gilbert W. Scott, Geneticist, Associated Seed Growers, and John W. Duffield, Geneticist, United States Forest Seeding, Genetics Station, Placerville, as speakers. The science of plant breeding was described and the practice of it in modern agriculture was explained.

Plant Pests and Diseases

The latest knowledge of "Plant Pests and Diseases and Their Control" was given in papers submitted by: Laurel G. Smith, Entomologist, Shell Chemical Corp.; John B. Steinweden, Entomologist, State Department of Agriculture; and Dr. D. G. Milbrath, Chief, Bureau of Plant Pathology, State Department of Agriculture, under the chairmanship of Prof. Pierre A. Miller, Pathologist, University of California at Los Angeles. New insecticides, fungicides, insects and diseases were described and their control discussed.

Prof. A. S. Crafts, Botanist, University of California at Davis, presented a paper on the "Chemistry of Weed Killers." This described how a weed killer can now be almost made to order to select one weed or plant from a group without injuring the others.

Prof. Woodbridge Metcalf, Extension Forester of the University of California, spoke instructively and entertainingly on "Uses of Illustrative Materials." He illustrated the value of diagrammatic representation by design, blueprints and charts, and methods of protecting specimens.

Peter Riedel, plantsman and teacher, Santa Barbara, presented a paper dealing with "Education and the Conference." It was chiefly for purposes of

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Mineral Show

*Mineralogical Societies of
State and Nation to Meet*

By G. F. WINSLOW, Associate Highway Engineer

THROUGH the cooperation of the Materials and Research Department of the California Division of Highways with the committee in charge of the 1949 National and State Conventions of the American and California Federations of Mineralogical Societies, to be held in Sacramento June 24th-26th, the public will be able to see some of the details that are required when the State is preparing to construct a highway.

At numerous locations throughout the State, stream beds and dry washes contain gravel and sand deposits that, to the public, look like they would make good concrete aggregate. Samples of the material, when sent in for testing, show that they contain certain rock fragments of one or more types which in the past has caused considerable damage to the completed concrete structure.

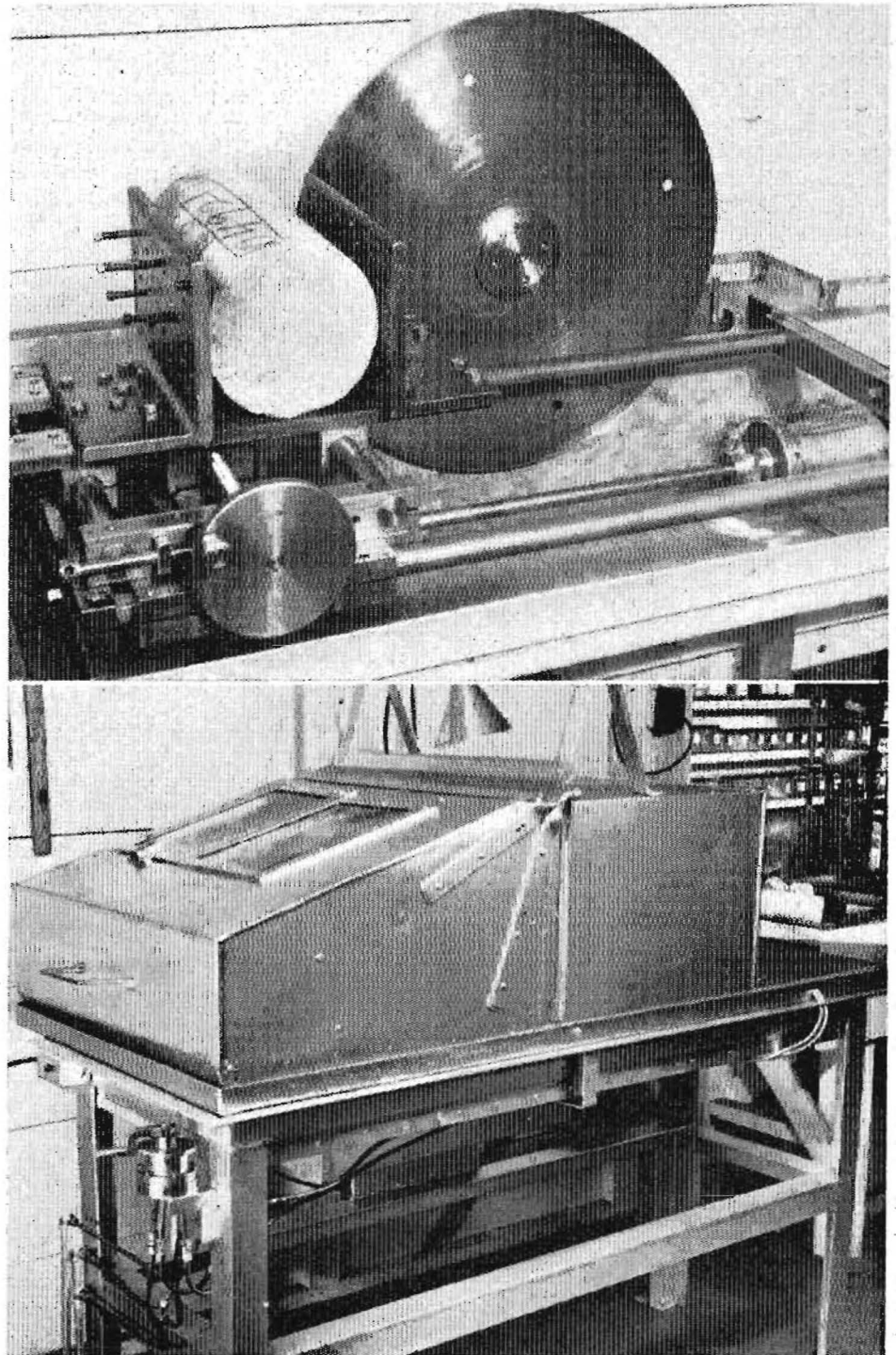
While there are a number of these reactive materials, including opaline cherts and some andesites, the most prominent ones in California are the opaline shales and the cherts which are found primarily along the Coast Range from Monterey County south to Orange County. Samples of these reactive aggregates will be displayed.

Rock Saw Invented

About six years ago the department designed and constructed a rock saw capable of handling concrete cylinders and other large specimens and doing the work in a reasonably short time. This saw consists of a 20-inch diameter diamond studded 14-gauge steel disc mounted on a ball-bearing spindle and operated by a one-half horsepower motor. The carriage is operated both forward and return by hydraulic pressure which is supplied by the city water mains. Provision is made to raise and lower the arbor for better control of the cut in various size specimens.

The specimen holder consists of an adjustable vise with a range of 12 inches

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Santa Ana Freeway

Another Unit Is
Opened to Traffic

By PAUL O. HARDING, District Engineer

WITHOUT FANFARE or formalities of any kind, the barricades were removed on the morning of April 4, 1949, and public traffic was permitted to move over the newly completed extension of the Santa Ana Freeway from Soto Street in the City of Los Angeles southeasterly to Eastman Avenue. Added to the section from the Aliso Street crossing of the Los Angeles River to Soto Street that was opened to traffic about eighteen months ago, there is now a total of almost four miles of completed Santa Ana Freeway extending for one-half mile beyond the easterly Los Angeles city limits.

The Santa Ana Freeway is one of the most important of the freeways that have been established to serve Southern California areas. It is in effect an easterly extension of the Hollywood Freeway. It extends from the Los Angeles Civic Center in a general southeasterly direction through Los Angeles County and Orange County area to the City of Santa Ana.

The fact that the Santa Ana Freeway follows a northwesterly-southeasterly direction makes it of particular strategic value because so many of the important existing traffic arteries of this portion of the State have been laid out in a general northerly and southerly or easterly and westerly direction.

Fourteen Grade Separations

On the completed section there are 14 grade separation bridges, providing overpasses and underpasses. The construction schedule called for 17 separate contracts. The first contract to be let was for the construction of the Fourth Street grade separation bridge to carry the freeway under Fourth Street. This contract was awarded on January 5, 1946, and construction has been under way on various phases of the work continuously since that time.

The Santa Ana Freeway is a six-lane freeway with the width of the central dividing strip being 10-foot minimum

and 34-foot maximum. The traffic lanes are 12 feet wide. The pavement on the main traffic lanes of the freeway is eight inches thick, Class "B" Portland cement concrete, laid upon cement-treated subgrade and selected subgrade material. To provide color differentiation, the pavement for the interchange roadways is six inches of Class "B" Portland cement concrete base, topped by two inches of asphalt concrete surfacing.

The recently completed construction between Soto Street and Eastman Avenue included grading, paving, and the miscellaneous work that was necessary to connect up and make usable the previously completed grade separation overpasses and underpasses that had been built under prior contracts. The Griffith Company, contractor for this grading and paving work, completed this important freeway unit a

Aerial photograph, taken one year ago, looking easterly from completed section of Santa Ana Freeway at Soto Street to Eastman Avenue, showing completed grade separation and right of way cleared and ready for roadway construction





Aerial view taken May, 1949, from approximately same location as picture on opposite page, showing freeway construction completed easterly to Eastman Avenue and Public Works



UPPER—View westerly along Santa Ana Freeway from Olympic Freeway grade separation bridge. LOWER—View easterly along the Santa Ana Freeway from near Grande Vista Street, showing Lorena Street grade separation bridge



full two weeks ahead of the official time limit for the contract.

Many New Features

Construction operations on this contract were described in an article by Resident Engineer B. N. Frykland in the September-October, 1948, issue of *California Highways and Public Works*, and a second article by Assistant Resident Engineer W. V. Brady in the March-April, 1949, issue. Many unusual features of construction procedure and methods of embankment compaction and cement treatment of subgrade were described in these two illustrated articles.

Many new features have been provided for the convenience and safety of public traffic using this freeway. Long lengths of rolled gutter and curb with five feet wide shoulders paved with three-inch thicknesses of plant-mixed surfacing have been constructed so that vehicles needing to make emergency stops will have ample opportunity to drive off the main traffic lanes and out of the way of the fast moving freeway traffic.

New Directional Signs

In addition to the customary reflectorized warning and directional signs with white eight-inch high lettering on a black background, directional signs of a new type have been installed. For increased legibility, lower case letters are used on these special signs that are placed at the turn-off locations, and the signs are placed high above the

driver's eye so as to be visible from a considerable distance.

By experiment it has been indicated that signs utilizing lower case lettering can be understood more readily than signs that are all in capital letters. This is contrary to a general prevailing belief that legibility is increased by the use of capital letters. It is anticipated that there will be an increased use of signs with lower case lettering as soon as the effectiveness in practical use has been more conclusively proven.

For ease in reading the directional signs at night, a special type of fluorescent lighting has been provided by means of small diameter tubes which give more effective illumination. These fluorescent tubes are known by the trade name "Slimline."

At all on and off interchange roadway connections, adequate lighting has been provided. The steel lighting standards place the luminaires 30 feet above the pavement. The lights are special type 10,000- and 15,000-lumen lamps with a highly refractive type of glass cover so that increased intensity of light is obtained at those points where the driver needs to have good night-time visibility.

The accompanying photographs show sections of the two-mile unit of the Santa Ana Freeway construction that has recently been completed and opened to traffic.

State highway construction contracts on the freeway have been completed as follows:

Description	Contractor	Construction cost
Road Construction, Kearney St. to Soto St.	Peter Kiewit Sons' Co.	\$1,374,000
Seventh St., Grade Separation	Byerts & Dunn	239,800
Lorena St., Grade Separation	W. J. Disteli	147,800
Storm Drain and Sewers, Soto St. to Indiana St.	Mike Radich & Co.	416,500
Fourth St., Grade Separation	Byerts & Dunn	145,200
First St., Grade Separation	J. E. Haddock	183,000
Aliso St., Ramp 4 Bridges	Contracting Engrs. Co.	132,100
Boyle Ave., Grade Separation	Peter Kiewit Sons' Co.	202,600
Landscaping, Kearney St. to Soto St.	Jannoch Nurseries	79,700
Olympic Parkway, Grade Separation	J. E. Haddock	332,900
Esperanza St. and Indiana St., Grade Separations	J. E. Haddock	272,100
Soto St., Grade Separation	Oberg Bros.	205,800
Euclid St. and Marietta St., Grade Separations	Spencer Webb	265,000
Road Construction, Aliso St. to Kearney St.	Vido Kovacevich Co.	235,500
Landscaping, Aliso St. to Kearney St.	Jannoch Nurseries	11,300
Road Construction, Soto St. to Eastman Ave.	Griffith Co.	1,052,700
Highway Lighting	Electric & Machinery Service Co.	118,000
Total		\$5,414,000

Huge Job

Continued from page 41 . . .

Ramona Freeway: Los Angeles to Pomona. We look with confidence to ultimate construction along the Ramona Freeway from Indiana Street to the east city limits of Los Angeles, easterly to Rosemead Boulevard. Practically all building improvements have been removed from the right of way area easterly from Indiana Street to the west city limits of Alhambra. Through the south portion of the City of Alhambra over 50 percent of the buildings have been relocated; all of the remaining 50 percent of the residence buildings are of such age and condition that they can be relocated and rehabilitated and fortunately there are ample vacant lots in the immediate vicinity of the present location of the buildings to assure their relocation and rehabilitation. Extending easterly from the east city limits of Alhambra to Rosemead Boulevard very few residential buildings will be affected, and all are capable of being relocated within a maximum distance of a block or two where vacant lots are available.

Arroyo Seco Parkway: 73 families, consisting of 293 people, moved and rehabilitated.

Optimistic of Future

As we in the Right of Way Department look forward to the huge job ahead in clearing right of way for the Harbor Parkway extending southerly from Olympic Boulevard to the harbor, the East By-pass and other freeway projects that are bound to follow, we realize that the worst of our job is over. The housing shortage in the metropolitan area of Los Angeles is slowly but surely easing, but the strongest contributing factor to our optimism is the fact that in these areas there are few, if any, residence buildings that cannot be relocated and rehabilitated on new lots within close proximity of their present location.

It is anticipated, because of the easing of the housing shortage in the Los Angeles area, that within the very near future the program of selling buildings "tenant occupied" can be discontinued and all residential building improvements can be sold at public auction in the usual manner free of tenants. In this connection it is pointed out that all auction sales are conducted in public after ample publicity and postal card notice to all persons or firms who have requested that their names be carried on our mailing list; it follows that the tenant living in the building to be sold has his fair chance in common with the public generally to purchase the building.

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Santa Ana Freeway

Another Major Unit
Under Construction

By G. L. LAIRD, Associate Bridge Engineer
and

B. N. FRYKLAND, Associate Highway Engineer

THE INTERSECTION of the two state highways, Atlantic Boulevard and Anaheim-Telegraph Road, has long been one of the most critical traffic bottlenecks in the Los Angeles metropolitan area. For those motorists who regularly use either one of these highways, it was welcome news to hear that on October 28, 1948, the California Division of Highways awarded a contract to build a third section of the Santa Ana Freeway and at the same time relieve the serious congestion at this intersection.

This project is a portion of the Santa Ana Freeway which, when completed, will become one of the most important connections of the Los Angeles area with Orange County and San Diego. To date, two sections of this freeway have been completed and have been described in separate articles. This third section of the freeway now under construction centers on Atlantic Boulevard, running approximately parallel to the existing Anaheim-Telegraph Road between La Verne Avenue and Eastland Avenue, and is 0.92 mile in length. The one and a half million dollars cost of the project is about evenly divided between bridge structures and road work.

Three 12-foot Lanes

New construction consists of the grading and paving of the freeway, which will provide three 12-foot lanes for traffic in each direction, separated by a 12-foot median strip. Atlantic Boulevard and Industrial Avenue are to be brought together southerly of the grade separation structure and carried over the freeway on this structure.

In addition to the Atlantic Boulevard Overcrossing, two other bridge structures are required. One is to carry the mainline tracks of the Union Pacific Railroad Company over the freeway, and a second is to carry the Good-

rich Avenue outer highway over the freeway.

As in all major projects constructed through residential, business and manufacturing areas, the problem of rerouting existing utilities constitutes one of the major items of work. In this case it was necessary to place underground the existing telephone cables crossing the proposed freeway site. The high voltage lines of the Southern California Edison Company, water mains, gas and oil lines, 18-inch and 24-inch trunk line sanitary sewers, and fire signal system had to be rerouted around the project. An existing street lighting system had to be removed and rebuilt. A new storm water drainage system had to be constructed to carry the water around the subway in place of in the natural open ditch which crossed the subway site.

Shoofly Trestle Built

Under an agreement signed between the Union Pacific Railroad Company and the State, moving of all railroad buildings and utilities on freeway site, as well as laying of shoofly track, was to be done by railroad forces. Under this agreement it was necessary to relocate a five-room hollow tile house, two two-family concrete slab houses, including a shower house and a wash house, and to connect these buildings to water, sewer, gas, and electric lines.

A 275-foot timber pile shoofly trestle was constructed over the freeway to carry the Union Pacific Railroad Company's mainline tracks during construction of the Union Pacific Railroad Underpass. All work involving construction of the temporary trestle and approach fills was performed by the contractor under contract bid items. The railroad company, using its own forces, placed the ties, ballast and rails for the shoofly, and also installed a temporary signal system. The cost of

work performed by the railroad forces will be about \$70,000.

Atlantic Boulevard Structure

The first of the grade separation structures to be built will be the Atlantic Boulevard Overcrossing. This structure is a two-span reinforced concrete box girder bridge, 131 feet in length, with closed abutments. It provides for six 12-foot traffic lanes, two five-foot sidewalks, and a six-foot median strip. Concrete superstructures have girders that vary from four to five feet in depth, are at 8-foot 2-inch centers, and have a 6-inch bottom slab and 6½-inch top slab thicknesses.

A second concrete structure is also to be constructed under this contract to carry the outer highway over the freeway. This structure is designated as the Goodrich Avenue Overcrossing. It is also a box girder type bridge and will be built on a 350-foot radius curve. It provides for a 26-foot roadway, one six-foot sidewalk, and one safety type curb.

At Station 85, the Union Pacific Railroad's three mainline tracks are to be carried over the freeway on a steel plate girder bridge consisting of two 71-foot 2½-inch spans, with a concrete center pier and concrete abutments and wing walls. The ballast type deck, consisting of a 7-inch reinforced concrete slab, will be supported by fifteen seven-foot deep steel girders spaced at 3-foot 2-inch centers.

Drainage Solved

In connection with the railroad underpass, a pump house and storm water storage box are being constructed. The two electrically driven pumps, with a capacity of 5,600 gallons per minute, will not only take care of the drainage into the freeway, but will also replace the existing pump house at the existing

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Aerial view of construction area on Santa Ana Parkway looking westerly, Atlantic Boulevard detour in foreground with new grade separation and Union Pacific Railroad shoofly trestle in center

Foothill Road

New Highway Between Grass Valley and Auburn Built

By SCOTT H. LATHROP, Senior Highway Engineer

ANOTHER SECTION of the Mother Lode Highway, California Sign Route 49, has been brought up to modern standards with the completion of work on the project between one and one-half miles north of Rattlesnake Creek and Grass Valley.

Located between Auburn and Grass Valley in the rolling foothill country, this road is a link in the highway connecting gold mining towns from Mariposa County to Sierra County. Many of the towns along this route which were famous mining centers a century ago now are little more than ghost towns, but others, including Grass Valley, still are prosperous communities and service gold mines which are among the largest in the country. Another stimulus to the business of the area has been the increased activity in the logging and lumber finishing industries caused by the large demand for such products in recent years.

The old road between Auburn and Grass Valley consisted of a 15-foot pavement constructed in 1923, to which 2-foot borders on either side

were added at a later date. The alignment included many curves with radii of less than 500 feet, the shortest being 250 feet. The maximum grade, occurring only on three short sections, was 7 percent. These standards, while adequate for traffic volumes and speeds then prevailing, were becoming more and more unsatisfactory as both volumes and speeds increased.

The new two-lane construction consisted in general of grading a 38-foot roadbed on new alignment and placing a 22-foot x 0.25-inch plant-mixed surfacing on a 23-foot x 0.33-inch crusher run base. On the 0.4 mile just south of Grass Valley the alignment is considered to be subject to readjustments, so the 22-foot x 0.25-inch plant-mixed surfacing was placed over the old 15-foot macadam pavement, which has been widened with 4-foot x 0.33-inch of crusher run base. Design standards used on the permanent portion of the alignment called for securing a minimum passing sight distance of 1,100 feet and a nonpassing sight distance of 350 feet, with a minimum radius of

curvature of 2,000 feet and a maximum grade of 6 percent. The saving in distance effected by construction on the new alignment was about 0.36 mile.

Construction of the new road required the moving of about 290,000 cubic yards of roadway material and the placing of about 74,000 tons of imported borrow, 11,000 tons of crusher run base and 8,600 tons of plant-mixed surfacing. Material for all three of these items was waste rock secured from mine dumps near Grass Valley. This waste material was deficient in fines, but fortunately mill sand, another mine waste material, was available in sufficient quantities. These waste products from the mines were secured at very reasonable prices, which in turn were reflected in the contract item prices secured from the contractor.

Work on this project was started in November, 1947, and completed in November, 1948, at a total cost of about \$350,000. The contractor was Fredrickson Brothers and the State's resident engineers were L. E. Elder and F. D. Hillebrand.

Looking toward Auburn from a point about two miles south of Grass Valley



Highway Bids and Awards for April, May, 1949

April, 1949

ALAMEDA COUNTY—On Foothill Boulevard between Castro Valley Junction and San Leandro, about 3.3 miles, shoulders to be reconstructed, crusher run base to be placed, existing pavement to be surfaced with dense and open graded plant-mixed surfacing. District IV, Route 5, Sections B, D. J. R. Armstrong, El Cerrito, \$244,522; Gallagher & Burk, Inc., Oakland, \$247,828; Fredrickson & Watson Construction Co., Oakland, \$248,992; Granite Construction Co., Watsonville, \$255,610; Fredrickson Bros., Emeryville, \$263,794; A. J. Raisch Paving Co., San Jose, \$268,060; Leo F. Piazza, San Jose, \$295,385. Contract awarded to Lee J. Immel, San Pablo, \$238,864.

ALAMEDA COUNTY—Between the south city limits and the west city limits of Hayward, about 1.8 miles, to be widened and resurfaced with plant-mixed surfacing on cement treated base, reconstructed shoulders, and on existing surfacing and pavement. District IV, Routes 105, 5. J. R. Armstrong, El Cerrito, \$85,767; O. C. Jones & Sons, Berkeley, \$90,651; J. Henry Harris, Berkeley, \$100,418; Granite Construction Co., Watsonville, \$102,747; Chas. L. Harney, Inc., San Francisco, \$115,472. Contract awarded to Lee J. Immel, San Pablo, \$83,255.

ALAMEDA COUNTY—Between Alvarado and San Leandro, about 5.4 miles, portions of existing pavement to be widened by scarifying and reshaping existing shoulders and placing crusher run base thereon, and portions to be surfaced with plant-mixed surfacing over the existing pavement and shoulders. District IV, Route 69, Section B. Fredrickson & Watson Construction Co., Oakland, \$168,196; Granite Construction Co., Watsonville, \$174,195; J. Henry Harris, Berkeley, \$185,201. Contract awarded to Clements & Co., Hayward, \$157,724.

ALAMEDA COUNTY—On East Shore Freeway, at High Street, in the City of Oakland, a railroad overhead consisting of steel beam spans supported on reinforced concrete bents and abutments on reinforced concrete piles, to be constructed. District IV, Route 69. C. B. Tuttle Co., Long Beach, \$689,549; Carl N. Swenson Co., Inc., San Jose, \$693,426; Johnson, Drake & Piper, Inc., Oakland, \$697,481; MacDonald, Young & Nelson & Morrison-Knudson Co., Inc., San Francisco, \$716,467; Haas & Rothschild, San Francisco, \$717,491; Fredrickson & Watson Construction Co. & M & K Corp., Oakland, \$718,849; Clinton Construction Co., San Francisco, \$732,857; Swinerton & Walberg Co., Oakland, \$734,004; Dan Caputo, San Jose, \$739,957; Bates & Rogers Construction Corp., San Francisco, \$742,710; Carrico & Gautier, San Francisco, \$750,940; Granite Construction Co., Watsonville, \$754,745; Barrett & Hill, San Francisco, \$759,058; Guy F. Atkinson Co., So. San Francisco, \$760,602; Stolte Inc. & the Duncanson-Harrelson Co., Oakland, \$781,695. Contract awarded to A. Soda & Son, Oakland, \$684,930.84.

BUTTE COUNTY—Between east city limits of Oroville and Feather River Bridge, about 4.1 miles, to be surfaced with untreated rock surfacing, a Class "B-Double" seal coat applied to the central portion, and penetration treatment applied to shoulders. District III, Route 21, Section B. Granite Construction Co., Watsonville, \$62,564; P. J. Moore & Son & Harms Bros., Sacramento, \$62,680; Jensen & Pitts, San Rafael, \$66,641; Close Building Supply, Hayward, \$68,257; W. C. Railing, Redwood City, \$75,369; A. R. McEwen, Willits, \$79,684; J. R. Reeves, Sacramento, \$91,343; O'Connor Bros., Red Bluff, \$95,953. Contract awarded to Rice Bros., Inc., Marysville, \$58,224.

COLUSA AND GLENN COUNTIES—Between 4 miles south of Williams and 0.3 miles south of Willows, about 26.3 miles bituminous surface treatment to be applied to shoulders. District III, Route 7, Section B, Wms., C. A. Clyde W. Wood, Inc., North Hollywood, \$37,727; Close Building Supply, Hayward, \$42,555; Phoenix Construction Co., Inc., Bakersfield, \$42,973; Claude C. Wood Co., Lodi, \$44,101; J. R. Armstrong, El Cerrito, \$45,750; W. H. O'Hair Co., Colusa, \$51,905; A. Teichert & Son, Inc., Sacramento, \$52,905; W. P. Railing,

Redwood City, \$53,120; J. Henry Harris, Berkeley, \$53,329. Contract awarded to Westbrook & Pope, Sacramento, \$31,952.50.

CONTRA COSTA COUNTY—Between 3.5 miles southeast of Brentwood and Byron Junction, about 1.4 miles to be surfaced with plant-mixed surfacing on crusher run base. District IV, Route 75, Section D. A. Teichert & Son, Inc., Sacramento, \$55,247; E. A. Forde, San Anselmo, \$55,296; O. C. Jones & Sons, Berkeley, \$55,699; Asta Construction Co., Rio Vista, \$57,263; Close Building Supply, Hayward, \$57,363; Lee J. Immel, San Pablo, \$58,105; Granite Construction Co., Watsonville, \$59,624; Gordon L. Capps, Stockton, \$60,653; J. Henry Harris, Berkeley, \$61,422. Contract awarded to C. M. Syar, Vallejo, \$54,551.

CONTRA COSTA COUNTY—Between Martinez Road and Willow Pass (portions) about 3.6 miles, to be surfaced with plant-mixed surfacing on crusher run base. District IV, Route 106, Section C. Lee J. Immel, San Pablo, \$156,489; Granite Construction Co., Watsonville, \$163,033; Martin Bros., Concord, \$163,167; Fredrickson & Watson Construction Co., Oakland, \$163,881; A. G. Raisch Co., San Francisco, \$166,489; J. R. Armstrong, El Cerrito, \$168,199; E. A. Forde, San Anselmo, \$169,495; Jensen & Pitts, San Rafael, \$169,611; Close Building Supply, Hayward, \$170,179; Harms Bros. & C. M. Syar, Sacramento, \$170,687; Chas. L. Harney, Inc., San Francisco, \$177,207; McGillivray Construction Co., Sacramento, \$180,945; Fredrickson Bros., Emeryville, \$182,796; J. Henry Harris, Berkeley, \$183,248. Contract awarded to Gallagher & Burk, Inc., Oakland, \$153,215.

DEL NORTE COUNTY—From Richardson Creek to 6.3 miles south of Crescent City (portions), about 6.3 miles, to be surfaced with plant-mixed surfacing on cement treated base. District I, Route 1, Sections A, B. Mercer Fraser Co. Inc., Eureka, \$287,830. Contract awarded to Harms Bros. & C. M. Syar, Sacramento, \$245,460.

DEL NORTE COUNTY—At Bear Creek about 9.5 miles northerly of Crescent City, about 0.3 mile to be graded and surfaced with imported base material and a seal coat to be applied. District I, Route 81, Section A. George Stout, Merced, \$32,973; C. M. Syar, Vallejo, \$33,847; O'Connor Bros., Red Bluff, \$36,102. Contract awarded to C. E. Johnson, Eureka, \$32,354.

GLENN COUNTY—Across Glenn-Colusa Canal at Hamilton City, the existing bridge to be repaired. District III, Route 47, Section A. F. Fredenburg, Temple City, \$13,043; James H. McFarland, San Francisco, \$13,123; H. W. Ruby, Sacramento, \$13,704; Metzger Co., San Pablo, \$15,371; C. C. Gildersleeve, Nevada City, \$16,408; B. S. McElderry, Berkeley, \$16,615; Chittenden & Chittenden, Auburn, \$17,310. Contract awarded to Shaul Construction Co., Hayward, \$10,974.

HUMBOLDT COUNTY—At Camp Creek, about one mile west of Orleans, the superstructure and portions of the reinforced concrete bents in the existing bridge to be removed and a new structural steel plate girder and rolled beam superstructure to be constructed. District I, Route 46, Section E. Huettig & Schompp, Palo Alto, \$49,236; Chittenden & Chittenden, Auburn, \$49,760; Reed & Tuttle, Redwood Valley, \$50,325; Dan Caputo, San Jose, \$50,353; Metzger Co., Los Angeles, \$51,500; Fred J. Maurer & Son, Eureka, \$55,159; Baldwin, Straub Corp., San Rafael, \$56,191; B. S. McElderry, Berkeley, \$58,480; Eichley Corp., San Francisco, \$60,045. Contract awarded to G. M. Carr & Bati Rocca, Santa Rosa, \$46,257.

HUMBOLDT COUNTY—Between 0.5 mile south of Stone Lagoon Summit and one mile south of Orick, about 3.8 miles to be graded. District I, Route 1, Section J. L. A. & R. S. Crow, El Monte, \$698,857; Westbrook & Pope, Sacramento, \$774,267; Fredrickson & Kasler, Sacramento, \$798,378; Harms Bros., Sacramento, \$843,738; N. M. Ball Sons, Berkeley, \$863,827; A. Teichert & Son, Inc., Sacramento, \$865,636; Guy F. Atkinson Co., South San Francisco, \$925,309; Haddock Engineers, Ltd.,

Oceanside, \$1,109,444; Stolte Inc., United Concrete Pipe Corp., The Duncanson-Harrelson Co. & Ralph A. Bell, Oakland, \$1,173,863. Contract awarded to Piombo Construction Co., San Francisco, \$668,708.

HUMBOLDT COUNTY—From 7.6 miles to 10.4 miles north of Orick, about 2.8 miles to be surfaced with plant-mixed surfacing on cement treated base. District I, Route 1, Section K. Harms Bros. & C. M. Syar, Sacramento, \$112,695. Contract awarded to Mercer Fraser Co., Inc., Eureka, \$102,187.

IMPERIAL COUNTY—Between Plaster City and El Centro, about 6 miles to be surfaced with road-mixed surfacing. District XI, Route 12, Sections B, C. Hensler Construction Corp., Glendale, \$39,795; Anderson Co., Visalia, \$40,445; Warren Southwest, Inc., Torrance, \$40,890; Arthur A. Johnson, Laguna Beach, \$41,625; Clyde W. Wood, Inc., North Hollywood, \$43,425; R. A. Erwin, Colton, \$43,530; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$43,725; Foster & McHarg, Riverside, \$209,553. Contract awarded to Roland T. Reynolds, Anaheim, \$37,830.

INYO COUNTY—Across Owens River and lower McNally Canal, about 4.5 and 7.5 miles north of Bishop, respectively, a steel beam bridge and a reinforced concrete culvert to be constructed, approaches thereto to be graded and surfaced with road-mixed surfacing and detours to be constructed. District IX, Route 76, Section A. E. G. Perham, Los Angeles, \$46,972; H. C. Smith Co., Los Angeles, \$53,864; Thomas Construction Co., Newhall, \$59,245. Contract awarded to Jas. R. Mathews Excavating Co., Alhambra, \$43,645.

KERN COUNTY—At Cow Creek, about 11 miles northeast of Bakersfield, a reinforced concrete box culvert to be constructed and about 0.1 mile of roadway to be graded and bituminous surface treatment applied thereto. District VI, Route 142, Section A. Griffith Co., Los Angeles, \$9,858; Phoenix Construction Co., Bakersfield, \$11,918. Contract awarded to Thomas Construction Co., Newhall, \$8,449.50.

KERN COUNTY—Between Snow Road and Cavelo, about 7.6 miles to be resurfaced with plant-mixed surfacing. District VI, Route 4, Sections D, E. Griffith Co., Los Angeles, \$110,632; Rand Construction Co., Inc., Bakersfield, \$115,660; Cox Bros. Construction Co., Stanton, \$119,693; Dicco Inc. & Dix Syl Construction Co., Inc., Bakersfield, \$128,514. Contract awarded to Peter Kiewit Sons Co., Arcadia, \$103,700.

KERN COUNTY—On Grapevine Grade, between Fort Tejon and 1.4 miles north of Grapevine, portions, about 5 miles in length, a reinforced concrete traffic deflector to be constructed and installed. District VI, Route 4, Section A. Rand Construction Co., Inc., Bakersfield, \$209,061; Griffith Co., Los Angeles, \$222,041. Contract awarded to Hensler Construction Corp., Glendale, \$192,770.

KERN COUNTY—Between Naval Ordnance Test Stations Gate and San Bernardino county line, about 4.0 miles to be surfaced with road-mixed surfacing. District IX, Route 212, Section A. Phoenix Construction Co., Inc., & Oilfields Trucking Co., Bakersfield, \$22,979; Arthur A. Johnson, Laguna Beach, \$25,323; R. A. Erwin, Colton, \$25,759; Bishop Engineering & Construction Co., Bishop, \$27,586; Browne & Krull, Hayward, \$28,806; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$29,015; Robert R. Hare, Glendale, \$29,153; Davis & Svartz, Bakersfield, \$32,949. Contract awarded to Rand Construction Co., Inc., Bakersfield, \$22,461.80.

KERN COUNTY—At Jerry Slough about 19 miles west of Bakersfield, a bridge and two culverts to be constructed. District VI, Route 58, Section K. E. L. Thorston, Santa Monica, \$14,983; Thomas Construction Co., Newhall, \$15,368; Troy Construction Co., Los Angeles, \$15,687; C. O. Bodenhamer, Redwood City, \$17,762; E. G. Perham, Los Angeles, \$17,874; F. Fredenburg, Temple City, \$17,949; Repsher Bros., General Contractors, Bakersfield, \$18,297; Rand Construction Co., Inc., Bakersfield, \$18,671; Paul E. Woolf, Fresno, \$19,799; Dicco Inc. & Dix Syl Construction Co., Inc., Bakersfield,

\$24,577. Contract awarded to Wm. E. Thomas Construction Co., Sacramento, \$12,811.

LAKE COUNTY—Portions between 1.3 miles and 5.9 miles north of Putah Creek, about 1.4 miles to be graded and surfaced with imported base material and seal coat. District I, Route 49, Section B. Fredrickson & Kasler, Sacramento, \$150,462; J. R. Reeves, Sacramento, \$155,661; Harold Smith, St. Helena, \$156,399; Piombo Construction Co., San Francisco, \$157,165; A. Teichert & Son, Inc., Sacramento, \$158,604; Nevada Constructors, Inc., Reno, \$166,375; Fredrickson Bros., Emeryville, \$167,691; Fredrickson & Watson Construction Co., Oakland, \$170,729; A. G. Raisch Co., San Francisco, \$173,507; Granite Construction Co., Watsonville, \$184,174; Harms Bros. & C. M. Syar, Sacramento, \$193,821; Westbrook & Pope, Sacramento, \$194,066; Silva & Hill Construction Co., Los Angeles, \$212,077. Contract awarded to Chittenden & Chittenden, Auburn, \$137,903.

LOS ANGELES COUNTY—On the Ridge Route, between 0.3 mile north of Los Alamos Creek and 2.3 miles south of the junction with State Highway Route 59, about 6.7 miles, to be graded and surfaced with plant-mixed surfacing on untreated rock base and a reinforced concrete slab bridge to be constructed. District VII, Route 4, Section J. N. M. Ball Sons, Berkeley, \$880,641; Vinnell Co., Inc., Alhambra, \$969,498; Clyde W. Wood, Inc., North Hollywood, \$972,947; Westbrook & Pope, Sacramento, \$988,524; Cox Bros. Construction Co. & J. E. Haddock, Ltd., Pasadena, \$1,042,328; Griffith Co., Los Angeles, \$1,051,552; Hensler Construction Corp. & R. R. Hensler, Glendale, \$1,066,431; Mike Radich & Co., Burbank, \$1,349,585. Contract awarded to Peter Kiewit Sons Co., Arcadia, \$874,114.

LOS ANGELES COUNTY—Boston Street extension, between Sunset Boulevard and Fremont Avenue, about 0.1 mile to be graded and surfaced with plant-mixed surfacing on Portland cement concrete base. District VII, Route 2. J. E. Haddock, Ltd., Pasadena, \$15,924; Griffith Co., Los Angeles, \$18,017; McClain Construction Co., Hawthorne, \$18,300; Jesse S. Smith, Glendale, \$19,057. Contract awarded to Dragline Rentals Co., Long Beach, \$15,619.

LOS ANGELES COUNTY—On Marathon Street, between Normandie Avenue and Alexandria Avenue, in the City of Los Angeles, about 0.2 mile outer highways to be graded and paved with asphalt concrete on untreated rock base. District VII, Route 2. J. E. Haddock, Ltd., Pasadena, \$26,315; Griffith Co., Los Angeles, \$26,772; G. & H. Paving Co., Los Angeles, \$26,960; S. A. Cummings, Compton, \$27,605; Spencer Webb Co., Los Angeles, \$29,085. Contract awarded to McClain Construction Co., Hawthorne, \$25,686.

LOS ANGELES COUNTY—Across San Gabriel River, about 8.5 miles west of Anaheim, a steel plate girder bridge to be constructed and about 0.5 mile of approaches to be graded and surfaced with plant-mixed surfacing on untreated rock base. District VII, Route 178, Section A. C. B. Tuttle Co., Long Beach, \$281,378; Guy F. Atkinson Co., Long Beach, \$285,095; Lars Oberg, Los Angeles, \$287,224; Sharp & Fellows Contracting Co., Los Angeles, \$290,365; W. J. Disteli, Los Angeles, \$291,196; Byerts & Sons, & E. G. Perham, Los Angeles, \$295,494; H. Earl Parker Inc. & Thomas Construction Co., Newhall, \$296,332; Bent Construction Co., Los Angeles, \$299,653; Chas. MacClosky Co., San Francisco, \$311,883; John Strona, Pomona, \$313,530; Spencer Webb Co., Los Angeles, \$314,950; Cox Bros. Construction Co., Stanton, \$317,870; United Concrete Pipe Corp., Baldwin Park, \$319,375. Contract awarded to R. M. Price Co., & O. B. Pierson, Alhambra, \$279,625.

LOS ANGELES COUNTY—On Sepulveda Blvd., between Playa Street and east city limits of Culver City, about one mile, shoulders to be graded and surfaced with plant-mixed surfacing on imported subbase material and untreated rock base and existing pavement to be resurfaced with plant-mixed surfacing. District VII, Route 158, Sections B, L. A. Jesse S. Smith, Glendale, \$75,965; Oswald Bros. Co., Los Angeles, \$79,297; S. A. Cummings, Compton, \$82,837; Griffith Co., Los Angeles, \$82,875; C. O. Sparks Inc. & Mundo Engineering Co., Los Angeles, \$83,252. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$72,670.50.

LOS ANGELES COUNTY—On Pioneer Blvd. and San Antonio Drive, between Orangethorpe Ave-

nue & Firestone Blvd. (portions) about 3.4 miles to be resurfaced with plant-mixed surfacing and imported borrow to be placed on shoulders and bituminous surface treatment applied thereto. District VII, Route 170, Section A. Jesse S. Smith, Glendale, \$65,204; Griffith Co., Los Angeles, \$65,692; Cox Bros. Construction Co., Stanton, \$67,135; Sully-Miller Contracting Co., Long Beach, \$67,956; Oswald Bros. Co., Los Angeles, \$68,065; C. O. Sparks, Inc. & Mundo Engineering Co., Los Angeles, \$69,350; O'Brien & Bell Construction Co., Santa Ana \$70,715. Contract awarded to John J. Swigart Co., Torrance, \$61,058.

LOS ANGELES COUNTY—On Firestone Blvd. between Manchester Avenue and Calden Avenue, about 0.4 mile to be surfaced with plant-mixed surfacing. District VII, Route 174, Section B. C. O. Sparks Inc. & Mundo Engineering Co., Los Angeles, \$12,431; Vido Kovacevich Co., South Gate, \$12,905; Cox Bros. Construction Co., Stanton, \$13,963. Contract awarded to Griffith Co., Los Angeles, \$12,174.56.

LOS ANGELES COUNTY—Over Santa Ana Parkway and inlet ramp, at Los Angeles Street, in the City of Los Angeles, two reinforced concrete bridges for overcrossings to be constructed. District VII, Route 2. W. J. Disteli, Los Angeles, \$443,164; Spencer Webb Co., Los Angeles, \$507,893; Guy F. Atkinson Co., Long Beach, \$522,826. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$424,341.

LOS ANGELES COUNTY—At the intersection of Garvey Avenue with Denton Avenue and in the cities of Monterey Park and Montebello at the intersection of Third Street with Garfield Avenue, furnishing and installing traffic signal system and highway lighting. District VII, Routes 26, 172, Sections A, MonP, Mtbl. C. D. Draucker, Los Angeles, \$14,880; Paul R. Gardner, Ontario, \$16,264; Westates Electrical Construction Co., Los Angeles, \$16,431; Tri-Cities Electric Service, Inc., Los Angeles, \$16,482. Contract awarded to Prescott Electric & Manufacturing Co., Los Angeles, \$13,285.

MADERA COUNTY—Between ¼ mile north of Dry Creek and ½ mile north of Berenda, about 2.7 miles to be graded and paved with Portland cement concrete on cement treated subgrade and plant-mixed surfacing on untreated rock base; and a reinforced concrete slab bridge to be constructed across Berenda Creek. District VI, Route 4, Section B. Fredrickson Bros., Emeryville, \$342,989; M.J.B. Construction Co., Stockton, \$348,513; Granite Construction Co., Watsonville, \$349,243; N. M. Ball Sons, Berkeley, \$359,453; A. G. Raisch Co., San Francisco, \$366,541; Fredrickson & Watson Construction Co., Oakland, \$367,010; Harms Bros., Sacramento, \$372,537; Cox Bros. Construction Co. and J. E. Haddock, Ltd., Pasadena, \$373,028. Contract awarded to Guy F. Atkinson Co., South San Francisco, \$338,882.25.

MARIN COUNTY—Across Petaluma Creek at Green Point, the bascule span of the bridge to be redecked. District IV, Route 8, Section A. Louis Bormolini & Son, Novato, \$19,920; Adams Arras & Son, San Francisco, \$20,278; B. S. McElderry, Berkeley, \$20,620; Underground Construction Co., Oakland, \$21,402; Minton & Kubon, San Francisco, \$21,850; James H. McFarland, San Francisco, \$22,627; Bos Construction Co., Oakland, \$22,765; Eichleay Corp., San Francisco, \$24,498; Baldwin Straub Corp., San Rafael, \$25,105; Shaul Construction Co., Hayward, \$26,745. Contract awarded to Evans Construction Co., Berkeley, \$19,555.

MERCED COUNTY—Between Highline Canal and Los Banos, about two miles, untreated rock base to be placed over existing pavement and surfaced with plant-mixed surfacing. District X, Route 32, Section B. C & M Contracting Co., Manhattan Beach, \$49,477; M. J. Ruddy & Son, Modesto, \$50,589; Frank B. Marks & Sons, Tracy, \$53,795; Browne & Krull, Hayward, \$57,029; Clements & Co., Hayward, \$58,155; Ted F. Bann, Fresno, \$60,455; Valley Paving & Construction Co., Pismo Beach, \$60,756; Beerman & Jones, Sonora, \$62,130; Anderson Co., Visalia, \$63,627; W. C. Railing, Redwood City, \$71,828; Gene Richards, Fresno, \$76,527. Contract awarded to Granite Construction Co., Watsonville, \$47,872.

MERCED COUNTY AND STANISLAUS COUNTIES—Between Merced River and Delhi and between Merced-Stanislaus County line and Hatch Crossing, a distance

of about 10.9 miles, portions to be surfaced with plant-mixed surfacing. District X, Route 4, Sections D, A, Cer, B. Granite Construction Co., Watsonville, \$88,769; Frank B. Marks & Sons, Tracy \$90,860; Standard Materials Co., Modesto, \$91,250. Contract awarded to M. J. Ruddy & Son, Modesto, \$87,720.

ORANGE COUNTY—At Coyote Creek, about 0.4 mile west of Route 2, a 142-inch by 90-inch field assembled metal plate pipe arch culvert to be constructed. District VII, Route 176, Section A. E. S. & N. S. Johnson, Fullerton, \$11,700; C. B. Tuttle Co., Long Beach, \$12,064; Geo. K. Thatcher, Los Angeles, \$13,524; Cox Bros. Construction Co., Stanton, \$13,990; G. & H. Paving Co., Los Angeles, \$15,893. Contract awarded to Jas. R. Mathews Excavating Co., Alhambra, \$10,794.

RIVERSIDE COUNTY—Between 1.5 miles east of Garnet and Edom, about 10.4 miles, plant-mixed surfacing to be placed over existing pavement and shoulders and seal coat applied thereto. District VIII, Route 26, Section D. R. A. Erwin, Colton, \$129,555; John J. Swigart Co., Torrance, \$129,635; Basich Bros. Construction Co. and Basich Bros., San Gabriel, \$132,375; Griffith Co., Los Angeles, \$133,867; Cox Bros. Construction Co., Stanton, \$139,360; Geo. Herz & Co., San Bernardino, \$144,457; Dicco Inc. & Dix Syl Construction Co., Inc., Bakersfield, \$161,082; Winston Bros. Co. & Yount Construction, Inc., Anaheim, \$166,850; Peter Kiewit Sons Co., Arcadia, \$178,850; Fredrickson & Kasler, Sacramento, \$189,215. Contract awarded to R. P. Shea Construction Co., Indio, \$122,887.

RIVERSIDE COUNTY—In the City of Hemet between west city limits and State Street and between junction Route 64 and north city limits, about 1.5 miles, to be surfaced with plant-mixed surfacing on existing pavement and shoulders. District VIII, Routes 64, 194. R. A. Erwin, Colton, \$21,162; E. L. Yeager, Riverside, \$26,055. Contract awarded to Geo. Herz & Co., San Bernardino, \$19,929.

RIVERSIDE COUNTY—Between Shavers Well and Descrit Center and between four miles west of Hopkins Well and Black Butte, about 10.9 miles to be surfaced with road-mixed surfacing. District XI, Route 64, Sections B, D. Clyde W. Wood, Inc., North Hollywood, \$66,577; R. A. Erwin, Colton, \$68,130; Arthur A. Johnson, Laguna Beach, \$68,750; Covina Construction Co., Covina, \$72,060; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$72,782; Anderson Co., Visalia, \$78,770; Ronald T. Reynolds, Anaheim, \$83,312; Vinnell Co. Inc., Alhambra, \$107,520. Contract awarded to Hensler Construction Corp., Glendale, \$64,980.

SACRAMENTO COUNTY—In the City of Sacramento at 59th Street and Folsom Boulevard, a truck shelter, oil house and fence to be constructed. District III, Warehouse. Continental Construction Co., Sacramento, \$24,298; Campbell Construction Co., Sacramento, \$24,889; Holdener Construction Co., Sacramento, \$25,489; Affiliated Engineers-Contractors, Inc., Sacramento, \$26,941. Contract awarded to J. A. Waterbury Construction Co., Sacramento, \$23,726.70.

SAN BERNARDINO COUNTY—Surfacing Euclid Avenue in the City of Upland. District VIII, Route 192. Ken Loew, San Bernardino, \$13,375; Parker Engineering Co., Claremont, \$12,217; Garrett Construction Co., Claremont, \$13,871; George Herz & Co., San Bernardino, \$11,223; R. A. Erwin, Colton, \$10,600. Contract awarded to Match Bros., Colton, \$10,435.

SAN BERNARDINO COUNTY—Between Long Point and 1.3 miles west of Running Springs, about 4 miles to be graded and surfaced with plant-mixed surfacing. District VIII, Route 207, Section A. Westbrook & Pope, Sacramento, \$787,938; Vinnell Co. Inc., Alhambra, \$837,364; N. M. Ball Sons, Berkeley, \$882,754; Sharp & Fellows Contracting Co., Los Angeles, \$894,368; Claude Fisher Co. Ltd., Los Angeles, \$953,404; Silva & Hill Construction Co. & Peter L. Ferry & Son & John M. Ferry, Los Angeles, \$985,273; L. A. & R. S. Crow, El Monte, \$1,010,208; Clyde W. Wood, Inc., North Hollywood, \$1,063,279; Haddock Engineers, Ltd., & Cox Bros. Construction Co., Montebello, \$1,077,378; Peter Kiewit Sons Co., Arcadia, \$1,229,572. Contract awarded to Fredrickson & Kasler, Sacramento, \$779,093.

SAN DIEGO COUNTY—Across Sweetwater River about 16 miles south of Julian, a reinforced concrete bridge to be constructed and about 0.34 mile of

approaches to be graded and bituminous surface treatment applied thereto. District XI, Route 78, Section A. E. G. Perham, Los Angeles, \$63,913; Clifford C. Bong & Co., Arcadia, \$66,901; Walter H. Barber & H. R. Breeden, La Mesa, \$74,302. Contract awarded to Thomas Construction Co., Newhall, \$63,083.50.

SAN JOAQUIN COUNTY—Between Mariposa Road south of Stockton and Calaveras River north of Stockton; and between Wilson Way and new Route 4 in Stockton, about 7.2 miles to be graded and paved with Portland cement concrete on cement treated subgrade and with plant-mixed surfacing on Portland cement concrete base and untreated rock base. District X, Routes 4, 5, Sections E, Stkn, C, Stkn. Fredrickson Bros., Emeryville, \$1,079,580; M.J.B. Construction Co., Stockton, \$1,091,875; Fredrickson & Watson Construction Co., Oakland, \$1,095,082; Westbrook & Pope and A. G. Raisch, Sacramento, \$1,098,661; N. M. Ball Sons, Berkeley, \$1,115,700; A. Teichert & Son, Inc., Sacramento, \$1,177,353; Haddock-Engineers, Ltd., Engineers, Limited, Cox Brothers Construction Co., Stanton, \$1,183,327; Griffith Co., Los Angeles, \$1,189,972; Guy F. Atkinson Co., South San Francisco, \$1,219,423; Stolte Inc. & The Duncanson-Harrelson Co., Oakland, \$1,348,136. Contract awarded to United Concrete Pipe Corp., Baldwin Park, \$1,067,164.50.

SAN JOAQUIN COUNTY—Between southerly boundary and junction with Route 5, about 8.3 miles untreated rock base and plant-mixed surfacing to be placed. District X, Route 41, Section A. Frank B. Marks & Sons, Tracy, \$121,570; George French, Jr., Stockton, \$121,645; Granite Construction Co., Watsonville, \$125,345; Brown & Krull, Hayward, \$128,835; Fredrickson Bros., Emeryville, \$137,650; Harms Bros. & C. M. Syar, Sacramento, \$141,987; Jensen & Pitts, San Rafael, \$149,897; A. Teichert & Son, Inc., Sacramento, \$152,905; E. A. Forde, San Anselmo, \$150,350; Claude C. Wood Co., Lodi, \$167,105. Contract awarded to M. J. Ruddy & Son, Modesto, \$117,545.

SAN JOAQUIN COUNTY—Across Potato Slough, at Terminus, the swing span of an existing bridge to be redecked with lightweight concrete and the west approach spans thereof to be removed and new steel beam spans on steel piles to be constructed. District X, Route 53, Section C. Lew Jones Construction Co., San Jose, \$49,378; E. G. Perham, Los Angeles, \$49,660; Dan Caputo, San Jose, \$51,981; Chittenden & Chittenden, Auburn, \$52,192; Condict Co., Berkeley, \$55,889; Pomeroy Sinnock, Stockton, \$61,936. Contract awarded to R. G. Clifford, South San Francisco, \$45,482.

SAN JOAQUIN COUNTY—Between Brennan Road and the easterly San Joaquin County line, about 5.2 miles untreated rock base to be placed over existing pavement and surfaced with plant-mixed surfacing. District X, Route 66, Section E. M. J. Ruddy & Son, Modesto, \$89,915; Frank B. Marks & Sons, Tracy, \$91,870; Elmer J. Warner, Stockton, \$99,810; M.J.B. Construction Co., Stockton, \$125,305; A. Teichert & Son, Inc., Sacramento, \$129,915. Contract awarded to Granite Construction Co., Watsonville, \$89,435.

SAN LUIS OBISPO COUNTY—Between Cuesta Siding and one mile south of Santa Margarita, about 2.1 miles to be graded and surfaced with plant-mixed surfacing on imported base material. District V, Route 2, Section D. Clyde W. Wood, Inc., North Hollywood, \$471,389; Rand Construction Co. Inc., Bakersfield, \$478,124; Fredrickson & Kasler, Sacramento, \$483,801; Cox Bros. Construction Co. & J. E. Haddock, Ltd., Pasadena, \$493,240; Madonna Construction Co., San Luis Obispo, \$497,928; M.J.B. Construction Co., Stockton, \$509,404. Contract awarded to Granite Construction Co., Watsonville, \$434,455.

SAN MATEO COUNTY—Between Half Moon Bay and Alontara Creek, about 5 miles to be graded and surfaced with plant-mixed surfacing on imported base material. District IV, Route 56, Sections C, D. Granite Construction Co., Watsonville, \$374,345; Fredrickson Bros., Emeryville, \$375,118; N. M. Ball Sons, Berkeley, \$390,269; Fredrickson & Watson Construction Co., Oakland, \$397,389; Piombo Construction Co., San Francisco, \$417,789; L. C. Smith, San Mateo, \$406,939; Fredrickson & Kasler, Sacramento, \$410,971; Chas. L. Harney, Inc., San Francisco, \$423,329; Edward Keeble & Frank B. Marks & Sons, San Jose, \$456,377. Peter Sorensen, Red-

wood City, \$469,926; Songroth Bros. & J. O. Archibald, Mountain View, \$481,225; Harms Bros., Sacramento, \$543,333. Contract awarded to A. Teichert & Son, Inc., Sacramento, \$363,386.50.

SANTA BARBARA COUNTY—On San Julian Road, between Jalama Road and Route 149, about 4.3 miles to be graded and surfaced with plant-mixed surfacing on cement treated imported base material, on imported subbase material. District V, Route 56, Section B. Clyde W. Wood, Inc., North Hollywood, \$313,257; J. E. Haddock, Ltd., Pasadena, \$359,743; Dimmitt & Taylor, Monrovia, \$370,066; Fredrickson & Kasler, Sacramento, \$386,808; Madonna Construction Co., San Luis Obispo, \$419,339. Contract awarded to Rand Construction Co., Inc., Bakersfield, \$305,457.

SANTA CLARA COUNTY—Between Ford Road and Morgan Hill (portions), about 6.1 miles to be resurfaced with plant-mixed surfacing and the shoulders to be widened with plant-mixed surfacing and crusher run base with Class "C" Medium seal coat and a penetration treatment applied thereto. District IV, Route 2, Section B. Granite Construction Co., Watsonville, \$118,445; A. J. Raisch Paving Co., San Jose, \$118,691; Leo F. Piazza, San Jose, \$121,122. Contract awarded to McGillivray Construction Co., Sacramento, \$104,562.50.

SHASTA COUNTY—Between Anderson and Clear Creek, about 5.8 miles to be graded and surfaced with plant-mixed surfacing on cement treated base, a reinforced concrete slab bridge to be constructed across Spring Creek and two small bridges to be constructed across the A. C. I. D. Canal. District II, Route 3, Section A. Fredrickson Bros., Emeryville, \$781,557; Granite Construction Co., Watsonville, \$819,773; Harms Bros., Sacramento, \$830,654; Fredrickson & Kasler, Sacramento, \$865,190; A. Teichert & Son, Inc., Sacramento, \$925,406. Contract awarded to Fredrickson & Watson Construction Co., Oakland, \$742,432.10.

SISKIYOU COUNTY—Between Spring Hill and Weed, about 4.4 miles to be graded and grade separation structure constructed. District II, Route 3, Section A. Guy F. Atkinson Co., South San Francisco, \$360,681; Fredrickson & Watson Construction Co., Oakland, \$366,223; M.J.B. Construction Co., Stockton, \$374,447; E. R. Guerin, South San Francisco, \$415,852; L. A. & R. S. Crow, El Monte, \$441,474; Fredrickson Bros., Emeryville, \$469,943; Nat McDougall Co., Portland, \$494,719; M. Malfitano & Son, Inc., & Baldwin Straub Corp., San Rafael, \$512,022; Vinnell Co., Inc., Alhambra, \$583,835. Contract awarded to Harms Bros. & F. Fredenburg, Sacramento, \$349,749.50.

SISKIYOU COUNTY—Between Camp Lowe and Bailey Hill, about 7.8 miles to be surfaced with plant-mixed surfacing on crusher run base and on imported base material. District II, Route 3, Section C. Fredrickson & Watson Construction Co., Oakland, \$289,117; Clements & Co., Hayward, \$303,891; McGillivray Construction Co., Sacramento, \$311,602; Harms Bros., Sacramento, \$333,174. Contract awarded to A. Teichert & Sons, Inc., Sacramento, \$262,990.75.

SISKIYOU COUNTY—Across Dillon Creek about 27 miles north of Orleans, a steel beam and steel plate girder bridge to be constructed and about 0.3 mile of approaches to be graded and surfaced with selected material. District I, Route 46, Section A. Fred J. Maurer & Son, Eureka, \$193,235; Baldwin Straub Corp., San Rafael, \$175,889; Haas & Rothschild, South San Francisco, \$213,977; Chittenden and Chittenden, Auburn, \$192,748; E. H. Peterson & Son, Richmond, \$168,822; Guy F. Atkinson Co., South San Francisco, \$234,301. Contract awarded to G. M. Carr & Batti Rocca, Santa Rosa, \$166,432.

STANISLAUS & SAN JOAQUIN COUNTIES—Between Salida and one mile north of Ripon and between Calaveras River and Lodi, about 11.9 miles to be landscaped. District X, Route 4, Sections B, A, Rip. C. Hnetzig & Schromm, Palo Alto, \$12,549; Leonard Coates Nurseries, Inc., San Jose, \$14,758; Justic, Dunn Co., Oakland, \$15,955; Stephen L. Vistica, San Mateo, \$16,044; Tyson & Watters Co., Sacramento, \$17,682; Watkin & Sibbald, San Anselmo, \$23,552; Paul E. Woof, Fresno, \$26,980; George Stout, Merced, \$30,914. Contract awarded to Henry C. Soto Corp., Los Angeles, \$8,418.

TULARE COUNTY—Between Route 134 and Packwood Creek, about 5.8 miles, to be surfaced with plant-mixed surfacing. District VI, Route 132,

Section A. Guy F. Atkinson Co., South San Francisco, \$58,315; Granite Construction Co., Watsonville, \$64,920; Miles & Bailey, Madera, \$70,960. Contract awarded to Valley Paving & Construction Co., Inc., Pismo Beach, \$53,195.

YOLO COUNTY—Between Winters and Route 7, portions about 16.1 miles in length, imported base and imported base shoulders to be placed and bituminous surface treatment applied to upper three inches. District III, Route 90, Sections A, B. Close Building Supply, Hayward, \$127,997; Fredrickson Bros., Emeryville, \$131,232; A. G. Raisch Co., San Francisco, \$144,654; Harms Bros., Sacramento, \$148,380; Clyde W. Wood, Inc., North Hollywood, \$150,873; Phoenix Construction Co., Inc., Bakersfield, \$157,025; Fredrickson & Watson Construction Co., Oakland, \$162,969; A. Teichert & Son, Inc., Sacramento, \$172,015; E. A. Forde & A. R. McEwen, San Anselmo, \$152,440; W. H. O'Hair Co., Colusa, \$195,700. Contract awarded to McGillivray Construction Co., Sacramento, \$122,780.

YOLO COUNTY—Across Sacramento River, at Knights Landing, a portion of an existing bridge to be repaired by replacing the timber floor on the bascule span with open steel floor. District III, Route 87, Section A. James H. McFarland, San Francisco, \$31,272; Eichley Corp., San Francisco, \$31,631; Shaul Construction Co., Hayward, \$32,145; John Rocca, San Rafael, \$32,992; Lord & Bishop, Sacramento, \$33,130; C. C. Gildersleeve, Nevada City, \$35,050; Bos Construction Co., Oakland, \$35,262; Bailey Construction Co., San Rafael, \$35,670; Minton & Kubon, San Francisco, \$36,299; Chittenden & Chittenden, Auburn, \$38,870; F. Fredenburg, Temple City, \$38,940. Contract awarded to B. S. McElderry, Berkeley, \$30,610.

F.A.S. County Projects

IMPERIAL COUNTY—Between 0.5 mile north of New River and 2.0 miles west of Calipatria, about 20.1 miles in length, shoulders to be constructed of imported borrow, imported subbase material to be placed, cement treatment to be applied thereto, plant-mixed surfacing to be placed on central portion, imported base material to be placed on shoulders and other areas, and penetration treatment applied to shoulders. District XI, Route 649. R. P. Shea Construction Co., Indio, \$398,456; Basich Bros. Construction Co. & Basich Bros., San Gabriel, \$398,812; Cox Bros. Construction Co., Stanton, \$459,457; R. E. Hazard Contracting Co., San Diego, \$468,801; Griffith Co., Los Angeles, \$491,020; R. A. Erwin, Colton, \$509,715. Contract awarded to Hensler Construction Corp., Glendale, \$368,500.50.

LOS ANGELES COUNTY—Across Santa Fe Dam outlet works on San Gabriel River, about 1.5 miles southeast of Monrovia, a reinforced concrete girder bridge to be constructed. District VII, Route 849. Lars Oberg Contractor, Los Angeles, \$75,730; George W. Peterson, Los Angeles, \$75,890; Byerts & Son, Los Angeles, \$83,955; Guy F. Atkinson Co., Long Beach, \$86,740; J. E. Haddock, Ltd., Pasadena, \$92,591; E. G. Perham, Los Angeles, \$98,810; F. Fredenburg, Temple City, \$103,750; Clifford C. Bong & Co., Arcadia, \$103,870; Fred F. Greenfield Co., Los Angeles, \$106,059. Contract awarded to C. B. Tuttle Co., Long Beach, \$65,560.

MENDOCINO COUNTY—Between State Route 1 south of Hopland and State Route 70 at Talmage, a distance of about ten and four-tenths miles to be graded, surfaced with imported base material, and a prime coat and seal coat applied thereto. District I, Route 979. A. G. Raisch Co., San Francisco, \$177,643; Harold Smith, St. Helena, \$189,776; Arthur B. Siri, Inc., Santa Rosa, \$195,916; Harms Bros. & C. M. Syar, Sacramento, \$213,319; R. J. Armstrong, El Cerrito, \$215,287; W. H. O'Hair Co., Colusa, \$227,192; J. Henry Harris, Berkeley, \$280,498. Contract awarded to Nevada Constructors, Inc., Reno, \$165,656.72.

SAN BENITO COUNTY—At various locations, between 3 and 12 miles north of Hollister, a reinforced concrete slab bridge to be constructed and two concrete bridges and three concrete culverts to be widened. District V, Route 670. B. S. McElderry, Berkeley, \$29,444; Lew Jones Construction Co., San Jose, \$28,855; E. H. Peterson and Son, Richmond, \$29,128; Charley O. Bodenhamer, Redwood City, \$29,194; Granite Construction Co., Watsonville, \$29,366; Dan Caputo, San Jose, \$29,893;

George C. Renz Construction Co. Inc., Gilroy, \$31,177; E. L. Thorsten, Santa Monica, \$32,618; Chittenden & Chittenden, Auburn, \$34,485; R. G. Clifford, South San Francisco, \$36,884; Charles MacClosky Co., San Francisco, \$38,579. Contract awarded to Wm. E. Thomas Construction Co., Sacramento, \$26,653.

SAN LUIS OBISPO COUNTY—Between the easterly line of State Route 2 in the town of San Miguel and 0.4 mile east of the town of Estrella, about 4.2 miles in length to be graded. District V, Route 1085. Valley Paving and Construction Co., Inc., Pismo Beach, \$65,184; Eugene G. Alves, Pittsburg, \$66,846; Dimmitt & Taylor, Monrovia, \$69,395; E. C. Young and Co., Bakersfield, \$69,789; Rand Construction Co., Inc., Bakersfield, \$70,055; Anderson Co., Visalia, \$73,080; Granite Construction Co., Watsonville, \$74,625; Madonna Construction Co., San Luis Obispo, \$81,199; Close Building Supply, Hayward, \$88,207; Cox Bros. Construction Co. & J. E. Haddock, Ltd., Pasadena, \$97,142; O. C. Jones & Sons Co., Berkeley, \$108,510. Contract awarded to Eaton & Smith, San Francisco, \$62,053.80.

TULARE COUNTY—On West Olive Street, between 3.5 miles west of Porterville and Porterville, about 3.2 miles to be surfaced with plant-mixed surfacing on cement treated imported borrow. District VI, Route 1128. Valley Paving & Construction Co., Inc., Pismo Beach, \$101,617; Rand Construction Co., Inc., Bakersfield, \$104,382; Geo. E. France, Inc., Visalia, \$106,230; Gene Richards, Fresno, \$106,817; Anderson Company, Visalia, \$107,485; Volpa Brothers, Fresno, \$129,000. Contract awarded to Ted F. Baun, Fresno, \$86,844.

May, 1949

ALAMEDA COUNTY—On Eastshore Freeway, between south city limits and High Street in Oakland about 3.3 miles to be graded and paved with Portland cement concrete on a bituminous treated subgrade and separation structures constructed. District IV, Route 69. Fredrickson Bros., Emeryville, \$1,444,292; N. M. Ball Sons & Trewitt-Shields & Fisher, Berkeley, \$1,470,201; Chas. L. Harney, Inc., San Francisco, \$1,535,150; Stolte Inc. & Duncanson-Harrelson Co., Oakland, \$1,564,205; Cox Bros. Construction Co. & J. E. Haddock, Ltd., Pasadena, \$1,789,780. Contract awarded to Fredrickson & Watson Construction Co., Oakland, \$1,337,818.95.

ALAMEDA COUNTY—Across San Leandro Bay in the City of Alameda, the center pier of the existing swing span bridge to be repaired. District IV, Route 69. Ben C. Gerwick, Inc., San Francisco, \$18,717; M. B. McGowan, Inc., San Francisco, \$21,932. Contract awarded to Duncanson-Harrelson Co., Richmond, \$17,730.

BUTTE COUNTY—Across Butte Creek, about four miles southeast of Chico, two new steel beam spans to be constructed for the repair of the existing bridge. District III, Route 87, Section B. Granite Construction Co., Watsonville, \$17,590; Lord & Bishop, Sacramento, \$18,698; Chittenden & Chittenden, Auburn, \$22,090. Contract awarded to Lew Jones Construction Co., San Jose, \$16,912.50.

CONTRA COSTA COUNTY—Between 3.5 miles east of Broadway Tunnel and Route 107 in Walnut Creek, about 5.6 miles to be graded and surfaced with plant-mixed surfacing. District IV, Route 75, Sections A, WIC. Fredrickson & Watson Construction Co., Oakland, \$307,781; Gallagher & Burk, Inc., Oakland, \$311,165; Chas. L. Harney, Inc., San Francisco, \$319,814; Lee J. Immel, San Pablo, \$322,467; J. Henry Harris, Berkeley, \$330,901; Fredericksen & Kasler, Sacramento, \$337,357. Contract awarded to J. R. Armstrong, El Cerrito, \$305,382.36.

FRESNO COUNTY—Between Church Avenue and Broadway, about 1.2 miles to be landscaped. District VI, Route 4, Sections B, Fre. Huettig & Schromm, Palo Alto, \$19,979; Jack W. Brem, San Diego, \$20,802; Leonard Coates Nurseries, Inc., San Jose, \$23,949; Henry C. Soto Corp., Los Angeles, \$24,743; Tyson & Watters Co., Sacramento, \$25,097; Oliver's Flower Shop & Nursery, Fresno, \$25,105; California Nursery Co., Niles, \$27,017. Contract awarded to Jannoch Nurseries, Altadena, \$17,511.21.

GLENN COUNTY—Between 0.3 mile south of Willows and Tehama County line, a net distance of about 19.7 miles, apply bituminous surface treatment to existing shoulders and place plant-mixed surfacing on portions. District III, Route 7, Sections A, Wlos, B, C, Orl. O'Connor Bros., Red Bluff, \$79,791. Contract awarded to W. C. Railing, Redwood City, \$69,772.25.

IMPERIAL COUNTY—Between Holtville and Brawley, and between Heber and Brawley, about 3.4 miles to be surfaced with road-mixed surfacing on imported base material. District XI, Routes 187, 201, Sections BC, AB. Roland T. Reynolds, Anaheim, \$54,822. Contract awarded to Warren Southwest, Inc., Torrance, \$37,010.

INYO COUNTY—Between 1.25 miles south of Lone Pine and Bishop, at various locations of about 18.1 miles in length, shoulders to be surfaced with road-mixed surfacing. District IX, Route 23, Sections L, M, A, D. Arthur A. Johnson, Laguna Beach, \$53,289; Close Building Supply, Hayward, \$54,915; Browne & Krull, Hayward, \$55,821; Clyde W. Wood, Inc., North Hollywood, \$58,423. Contract awarded to Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$52,487.50.

INYO COUNTY—At Shoshone Maintenance Station, construction of prefabricated steel buildings. District IX, Route 127, Section P. Pascoe Construction Co., Pomona, \$9,789. Contract awarded to Fred D. Kyle, Balboa Island, \$7,650.

KERN COUNTY—At Hill Creek Cattlepass, 7.5 miles east of Arvin, a field-assembled plate culvert cattlepass to be constructed. District VI, Route 140, Section D. Griffith Co., Los Angeles, \$6,495; Phoenix Construction Co., Inc., Bakersfield, \$7,234; Jas. R. Mathews Excavating Co., Alhambra, \$7,377; Klein-Smith Construction Co., Bakersfield, \$7,535; Thomas Construction Co., Newhall, \$7,757. Contract awarded to Anderson Co., Visalia, \$5,495.

KINGS COUNTY—Between five miles north of Kettleman City and Fifth Standard Parallel south, about 5.3 miles, constructing a graded road bed, placing imported borrow, and applying bituminous surface treatment. District VI, Route 125, Section C. Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$112,935; Griffith Co., Los Angeles, \$114,312; Volpa Brothers, Fresno, \$115,005; George E. France, Inc., Visalia, \$117,196; Louis Biasotti & Son, Stockton, \$120,396; Anderson Company, Visalia, \$121,002; Clyde W. Wood, Inc., North Hollywood, \$125,670; K & H Company, Colton, \$134,442; Valley Paving & Const. Co., Inc., Pismo Beach, \$135,772; W. C. Railing, Redwood City, \$141,050. Contract awarded to Gene Richards, Fresno, \$94,384.

LOS ANGELES COUNTY—At intersection of Palisades Beach Road with California Avenue in the City of Santa Monica, furnish and install full traffic actuated signal system and intersection lighting, and at the intersection of Sepulveda Boulevard with Constitution Avenue, furnish and install semitrafic actuated signal system. District VII, Routes 60, 158, Section SMca. A. Prescott Elec. & Mfg. Co., Los Angeles, \$14,985; C. D. Draucker, Inc., Los Angeles, \$15,294. Contract awarded to Westates Electrical Construction Co., Los Angeles, \$14,446.

LOS ANGELES COUNTY—On Atlantic Boulevard at Patata Street, drainage facilities to be constructed. District VII, Route 167, Sections SGT, A. Edward Green, Los Angeles, \$23,230. Contract awarded to Vido Kovacevich, South Gate, \$14,611.

LOS ANGELES COUNTY—On Rosemead Boulevard, between Beverly Boulevard and Garvey Avenue, about 4.3 miles in length, a new two-lane roadway to be graded and paved with portland cement concrete on cement-treated subgrade and the existing roadway to be widened with asphalt concrete on untreated rock base to provide a four-lane divided highway. District VII, Route 168, Sections B, C. Griffith Co., Los Angeles, \$496,013; N. M. Ball Sons, Berkeley, \$499,248; Basich Bros. and Basich Bros. Construction Co., San Gabriel, \$500,652; Vido Kovacevich and Vido Kovacevich Co., South Gate, \$517,114. Contract awarded to J. E. Haddock, Ltd., Pasadena, \$467,770.60.

LOS ANGELES COUNTY—In the City of Burbank, between west city limits and Victory Boulevard, about 2.6 miles in length, existing pavement and shoulders to be surfaced with plant-mixed sur-

facing. District VII, Route 161. P. J. Akmadzich, Sunland, \$64,670; Griffith Co., Los Angeles, \$69,899. Contract awarded to Schroeder & Co., Sun Valley, \$62,654.

LOS ANGELES COUNTY—On Arroyo Seco Parkway at Orange Grove Avenue and Fair Oaks Avenue interchange, furnish and install highway lighting systems. District VII, Route 205. C. D. Draucker, Inc., Los Angeles, \$6,490; Westates Electric Construction Co., Los Angeles, \$8,191; Prescott Electric & Manufacturing Co., Los Angeles, \$11,975. Contract awarded to Electric & Machinery Service, Inc., South Gate, \$5,939.

MENDOCINO COUNTY—Between Maple Creek and 1.2 miles easterly, about 1.2 miles to be graded, road-mixed surfacing to be constructed on cement-stabilized imported base material and seal coats applied. District I, Route 48, Section A. Close Building Supply, Hayward, \$118,534; Harold Smith, Sr. Helena, \$119,447; Fredrickson Bros., Emeryville, \$133,775; Tyson & Watters Co., Sacramento, \$135,754; A. G. Raisch Co., San Francisco, \$165,191. Contract awarded to A. R. McEwen, Willits, \$111,044.

MENDOCINO COUNTY—Across Big River, about 12.4 miles south of Fort Bragg, the two-timber truss spans and their substructures of the existing bridge to be repaired. District I, Route 56, Section D. E. C. Perham, Los Angeles, \$79,694; Underground Construction Co., Berkeley, \$98,800; Ben C. Gerwick, Inc., San Francisco, \$101,615; Healy Tibbitts Construction Co., San Francisco, \$104,400. Contract awarded to Metzger Co., San Pablo, \$71,900.

MENDOCINO COUNTY—Between Sherwood Road and Sapp Creek, about 8.4 miles to be surfaced with plant-mixed surfacing on cement treated base. District I, Route 1, Section II. E. A. Forde & A. R. McEwen, San Anselmo, \$287,710; McGillivray Construction Co., Sacramento, \$289,927; Harms Bros. & C. M. Syar, Sacramento, \$298,701; Fredrickson & Watson Construction Co., Oakland, \$321,192. Contract awarded to Clements & Co., Hayward, \$283,955.

MODOC COUNTY—Between Toms Creek and Cedarville, about 8.1 miles to be graded and selected material placed. District II, Route 28, Section C. United Concrete Pipe Corp., Westbrook & Pope & R. A. Bell, Baldwin Park, \$767,561; Natt McDougall Co., Portland, Oregon, \$826,747; Vinnell Co., Inc., Alhambra, \$839,418; Fredrickson Bros., Emeryville, \$844,293; Fredrickson & Watson Construction Co., Oakland, \$868,123; Winston Bros. Co. & Yount Constructors, Inc., Azusa, \$871,265; L. A. & R. S. Crow & Charles J. Rounds, El Monte, \$939,028; A. Teichert & Son, Inc., Sacramento, \$967,092; Harms Bros. & N. M. Ball Sons, Berkeley, \$1,047,308; Gibbons & Reed Co., Salt Lake City, Utah, \$1,088,824; Piombo Construction Co. & M & K Corp., San Francisco, \$1,099,278. Contract awarded to R. B. Guerin & Co., South San Francisco, \$614,170.

MONO COUNTY—Between south county line and Benton Station, about 8.7 miles, road-mixed surfacing to be placed. District IX, Route 76, Sections A, B. Oilfields Trucking Co. and Phoenix Construction Co., Inc., Bakersfield, \$61,450; Anderson Company, Visalia, \$63,926; Close Building Supply, Hayward, \$65,958; Browne & Krull, Hayward, \$64,514; Rand Construction Co., Inc., Bakersfield, \$57,576. Contract awarded to Arthur A. Johnson, Laguna Beach, \$56,454.

MONTEREY COUNTY—Between San Ardo and King City, a net distance of about four miles, imported borrow to be placed over existing roadbed and surfaced with plant-mixed surfacing on stabilized imported base material. District V, Route 2, Sections G, F. Granite Construction Co., Watsonville, \$191,864; A. Teichert & Son, Inc., Sacramento, \$228,869; Madonna Construction Co., San Luis Obispo, \$236,986. Contract awarded to Fredericksen & Kasler, Sacramento, \$174,385.50.

ORANGE COUNTY—At the Atchison, Topeka & Santa Fe Railway crossing with Yorba Road, about 0.5 mile in length to be graded and surfaced with plant-mixed surfacing on untreated rock base. District VII, Route 175, Section B. Cox Bros. Construction Co., Stanton, \$43,641; Covina Construction Co., Covina, \$47,260; Peter Kiewit Sons Co., Arcadia, \$52,354; R. A. Irvin, Colton, \$52,837; Roland T. Reynolds, Anaheim, \$58,004; Dimmitt & Taylor, Monrovia, \$64,213. Contract awarded to K & H Co., Colton, \$42,329.

Ralph A. Tudor Will Organize Engineer Outfit

FORMAL notification of his selection to command a brigade of engineers, United States Army Engineer Reserve, was conveyed to Col. Ralph A. Tudor of San Francisco by Brig. Gen. Frederick B. Butler, Commanding Officer, Central Military District, Sixth Army, at a ceremony in the Office of Governor Earl Warren on May 24th.

It will be Tudor's responsibility to organize an engineer brigade, headquarters and headquarters company in California as part of the affiliation program of the Department of the Army. The brigade to be organized by Tudor is the fourth of 12 to be established throughout the United States. It will be sponsored by the State Department of Public Works, at the request of the Department of the Army. It will be the largest headquarters unit in the Engineer Reserve program. It will be composed of construction groups and battalions, port and battalions, aviation groups and battalions, and service and maintenance units. The engineer brigade headquarters will actively supervise the training of engineer units for service in time of war. Its general objectives will be to:

a. Foster in the civilian population of the Nation a realization of, and consideration for, the requirements of national defense.

b. Utilize to the maximum extent compatible with the requirements of industrial mobilization, the skills, developed in civilian pursuits by the affiliation of military units with civilian industries and organizations.

c. Assist in providing sufficient numbers and types of organized reserve corps units in the maximum state of readiness to support the Army of the United States in accordance with the requirements for mobilization.

"The brigade," reads a directive of the Department of the Army, "should be commanded and staffed by men outstanding in professional fields, as well as active in the Engineer Reserves."

Tudor is Chief of the Division of San Francisco Bay Toll Crossings in charge



Ceremony in Governor's office honoring Ralph A. Tudor. Left to right: Col. Dwight F. Johns, Division Engineer; Col. Frank R. Williams, Reserve Unit Instructor in Sacramento; Director of Public Works C. H. Purcell, Governor Warren, General F. B. Butler, Mr. Tudor, Major George O'Brien, Engineering Instructor; Col. Harry W. Anderson, and Lt. Col. E. M. Taubman

of the building of a second toll crossing of San Francisco Bay. He is a graduate of West Point and a colonel in the Engineer Reserve.

At the ceremony in the Governor's Office, Director of Public Works C. H. Purcell formally signed an agreement with the Department of the Army under which the Department of Public Works will sponsor the new brigade to be organized by Tudor.

Powwow

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developing suitable training courses for those who wish to go into arboriculture.

Western arboretas were described and discussed by: Ernest Higgins, landscape architect, Berkeley; Brian O. Mulligan, director, University of Washington Arboretum, and Maunsell Van Rensselaer, director, Santa Barbara Botanic Garden.

A. L. Olmsted, Assistant Landscape Architect, Division of Highways, Los Angeles, gave an interesting account of trees as used and grown in Spain, Italy, France and England.

A demonstration of equipment by the City of Sacramento Park Department and by commercial exhibitors was held in Capitol Park on Friday afternoon. Facilities of the park were made available through the courtesy of Jerry Olrich, state gardener.

Tours of Sacramento parks and the State Capitol were conducted for the

Present at the ceremony were General Butler, Col. Dwight F. Johns, Division Engineer, South Pacific Division, Corps of Engineers; Col. Harry W. Anderson, Department Engineer; Col. Frank R. Williams, Unit Instructor, Officers' Reserve Corps; Lieut. Col. E. M. Taubman, South Pacific Division; Maj. George O'Brien, Engineer Instructor at Large, Corps of Engineers; Purcell and Tudor.

ladies through the courtesy of W. A. Carroll and H. W. Culbertson of the Sacramento Park Department.

A business meeting on Saturday morning concluded activities following a banquet in Hotel Senator on Friday night.

New officers for 1949-1950 are: President, C. E. Lee, Southern California Edison Co., Alhambra; vice president, Victor Anderson, Superintendent of Parks, Stockton; California; secretary-treasurer, A. L. Olmsted, Assistant Landscape Architect, Division of Highways, Los Angeles. The next conference will be held in Long Beach, California.

NIGHT FATALITIES

Warm summer nights may be romantic—but they are also dangerous for drivers and pedestrians alike. Nearly two-thirds of all traffic fatalities occur during hours of darkness. Be extra careful at night, walking or driving.

NEW HIGHWAY COMMISSIONER

Appointed by Governor Earl Warren to succeed C. Arnholt Smith, resigned, Charles Thompson Leigh of San Diego assumed his duties as a member of the California Highway Commission at the meeting of the commission on May 19th.

With many years of road building experience and a successful career as a civil and mechanical engineer, Mr. Leigh comes to the Highway Commission ably equipped to handle his new responsibilities.

Mr. Leigh is recognized as an outstanding authority in the field of aircraft plant construction. From August, 1926, to November, 1927, he was assistant to the factory manager of the Consolidated Aircraft Corporation and was successively purchasing agent, materials supervisor and director of purchasing, director and vice president and assistant general manager of that corporation. On April 1, 1943, he was elected vice president of Consolidated Vultee Aircraft Corporation in charge of materials, plant facilities, plant engineering, industrial relations, and plant protection. He relinquished his operational duties on January 1, 1947, remaining as vice president until he resigned in December, 1947.

Mr. Leigh is director of the Solar Aircraft Company, vice president and director of the Langley Corporation, Balboa Radio Corporation, and Ward Theatre Enterprises, Inc.

Born in Nelson, Nebraska, September 25, 1855, Mr. Leigh was educated in the public schools of Chicago and Radcliffe, Iowa, to which cities his parents moved before settling in Seattle in 1901. He attended the University of Washington, and graduated with a B.S. in mechanical engineering at Worcester Polytechnic Institute, Massachusetts, in 1911. He filled various mechanical and civil engineering posts until 1917, when he was chief engineer of the Raymond, Washington, Unit Airplane Spruce Division during World War I. From 1919 to 1921 he was resident engineer of the Department of Highways of the State of Washington. He was service engineer for the Portland Cement Association in Montana during 1922 and from the end of 1922 to 1926 he was general superintendent



Charles Thompson Leigh

of Grays Harbor Construction Company, Hoquiam, Wash. He began his long service with Consolidated Aircraft Corporation as assistant to the factory manager in Buffalo in August, 1926.

Mr. Leigh and his family make their home at 1085 Moana Drive, San Diego. The Leigh's have two children, Charles C. Leigh, 28, and Jane, 25.

Santa Ana Freeway

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Atlantic Boulevard Subway. A concrete storage box under the pavement, with a capacity of 100,000 gallons, is being constructed as a safeguard against overloading of the pumps and flooding the subway in periods of maximum rainfall.

Main items of work involved in the three bridge structures are as follows:

Structure excavation	6,000 cu. yds.
Structure backfill	9,500 cu. yds.
Class "A" P. C. concrete	5,200 cu. yds.
Bar reinforcing steel	831,000 lbs.
Structural steel	1,130,000 lbs.
Steel railing	1,420 lin. ft.

The major items of road work involved in this contract consist of roadway excavation, furnishing and plac-

ing of imported subgrade material, preparation of cement stabilized subgrade, Portland cement concrete pavement, plant-mixed surfacing, curbs, gutters, sidewalks, storm drains consisting of reinforced concrete structures, reinforced concrete pipe and corrugated metal pipe, and other items of a more or less minor nature.

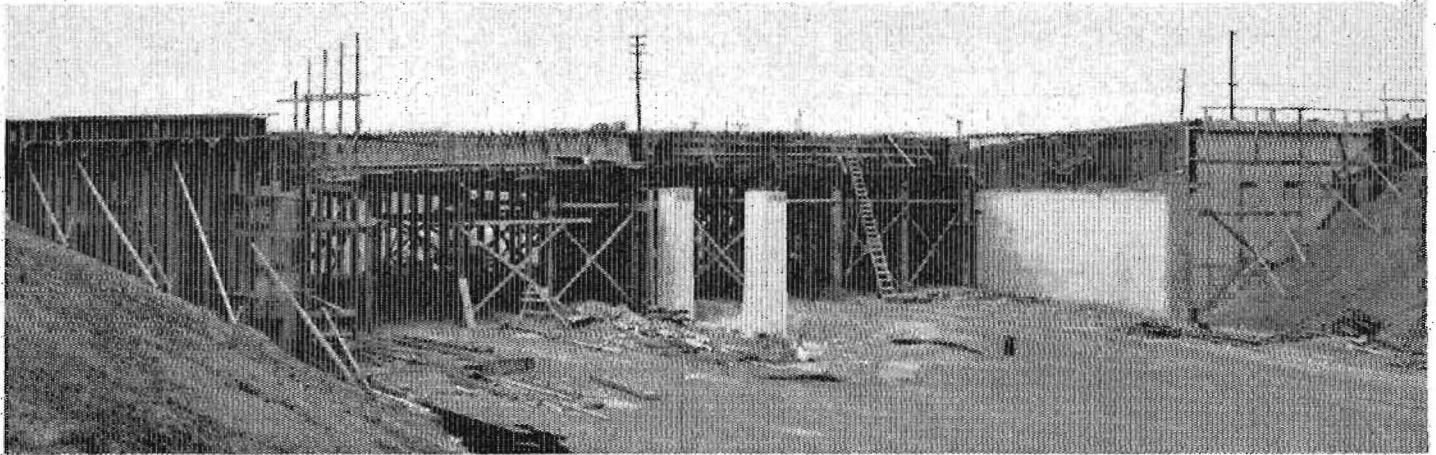
Como Street Detour

The first work of any consequence consisted of the construction of the Como Street detour to reroute Atlantic Boulevard traffic to the southeast and around that part of this highway which is to be reconstructed from Como Street to Anaheim-Telegraph Road. This reconstruction involves the raising of the grade and the construction of a grade separation structure to carry Atlantic Boulevard and Industrial Avenue over the freeway. As this detour will be in service the greater part of a year, and the traffic flow is extremely heavy, up to 5,000 cars per hour at peak hours, it was necessary to go into a high type of construction.

The existing portion of Como Street, from Atlantic Boulevard to a point approximately two hundred fifty feet from Anaheim-Telegraph Road, was resurfaced with three inches of plant-mixed surfacing over the old rock and oil surface. A new flared connection to Anaheim-Telegraph Road was constructed and channelized with a traffic island on the detour. Fixed time traffic signals were installed at this intersection, with provision for manual operation from a traffic control tower which was constructed to permit the highway patrol officers who direct traffic during peak hours to have an unobstructed view of the opposing traffic lanes. A permanent green arrow was installed as a part of the signal system so as to permit southbound traffic to make right turns from Anaheim-Telegraph Road onto the detour and thence to Atlantic Boulevard and points south without regard to the signals controlling through traffic on Anaheim-Telegraph Road.

Traffic Speeded Up

The construction of the detour and all facilities for the control of traffic has resulted in a very unusual situation, in that this heavy flow of traffic is now



View westerly along Santa Ana Freeway showing construction in progress on the Atlantic Boulevard grade separation bridge

able to pass through this area in less time and with less inconvenience than was possible prior to the closing of Atlantic Boulevard. The highway patrol officers and the traveling public concur in this opinion.

It will become necessary at a later date to reroute northbound Atlantic Boulevard traffic to Industrial Avenue south of the job limits for a short period of time in order to connect the new pavement on Atlantic Boulevard to the existing pavement at the Como Street intersection. This will definitely cause some inconvenience to traffic because of the necessary turning movements, but the work will be so planned

as to make this diversion of traffic as brief as possible.

Highway work now in progress consists of grading, storm drains, sanitary sewers, and miscellaneous small structures.

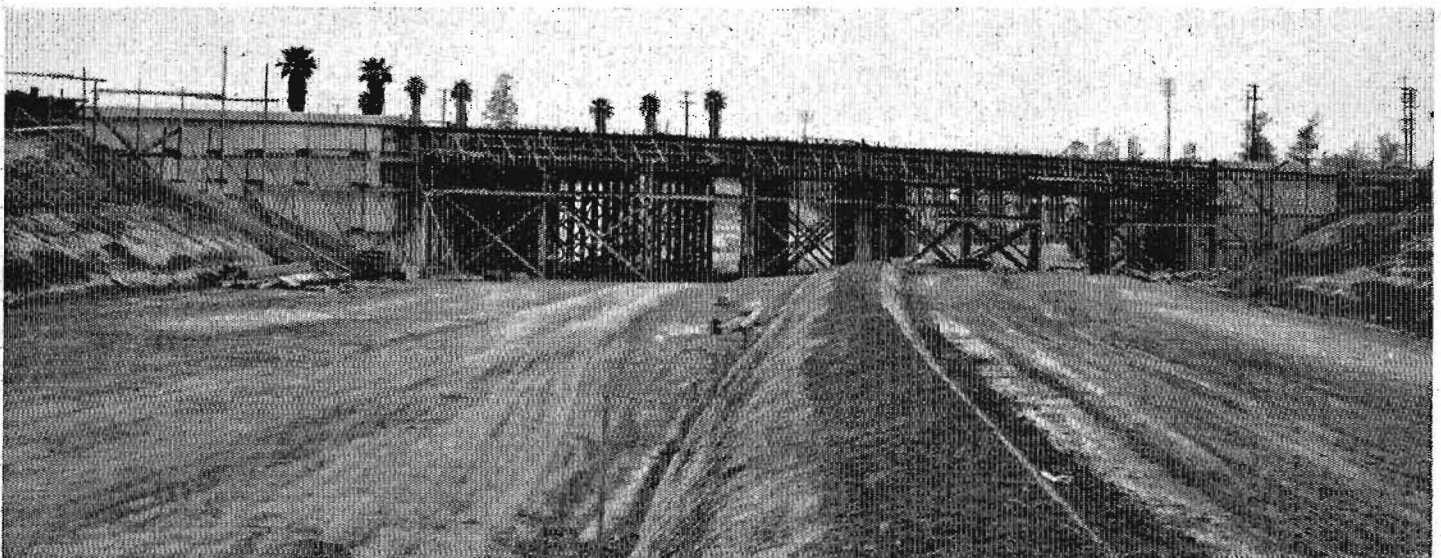
Major Items of Work

Major items of work involved in highway construction portion of the contract are as follows:

Roadway excavation	152,000 cu. yds.
Structure excavation	25,200 cu. yds.
Imported subgrade material...	106,000 tons
Subgrade (mix and compact cement treatment)	49,000 sq. yds.
Plant-mixed surfacing	9,000 tons
Portland cement concrete pavement	11,200 cu. yds.
Portland cement concrete (curbs, gutters, sidewalk)...	1,650 cu. yds.
Reinforced concrete pipe	5,000 lin. ft.

Highway work was designed under general supervision of S. V. Cortelyou, Assistant State Highway Engineer, and the bridge structures under supervision of F. W. Panhorst, Assistant State Highway Engineer. The Griffith Company of Los Angeles is the contractor on both bridge and road work, and the contract is administered by the Bridge Department of the Division of Highways. G. L. Laird is resident engineer, and B. N. Frykland is highway representative. J. F. Porcher is general superintendent for the contractor, with H. G. McGreggor as bridge superintendent. The project will be completed in the early part of 1950.

View looking southerly, showing construction in progress on Atlantic Boulevard grade separation bridge over Santa Ana Freeway



Bayshore Freeway

Continued from page 4 . . .

Freeway. The Guy F. Atkinson Company was low bidder and was awarded the contract on September 10, 1947. This is the second contract on this section of the freeway to be built by this contractor. The company was the successful bidder on a two and one-quarter mile portion from State Street in San Mateo to Broadway, Burlingame. That project was completed in November, 1947, at an approximate cost of \$700,000.

The major problem on this project, which traverses the marginal lands of San Francisco Bay, was the very high-water table, about 13-foot elevation. Indicative of the difficulty to be encountered was the half-mile stretch immediately south of the Southern Pacific Railroad in South San Francisco. Under a prior contract completed in March, 1947, this area was stabilized by means of vertical sand drains and an overlying sand blanket. An overload was placed and left for later removal.

Excavation in Mud

During excavation, mud was encountered having moisture content varying from 25 percent to 204 percent. The saturated unsuitable material was removed to depths as great as 15 feet in order to obtain subbearing soils having a moisture content of 20 percent or lower. These unsuitable material excavations were backfilled with imported rock base of the following grading: 18-inch maximum; not more than 50 percent passing a four-inch screen and not more than 20 percent passing the No. 4 mesh screen. From 2 to 10 feet of this material was placed, and the areas were then brought to grade with selected material for roadway excavation.

One of the major items was the portland cement concrete pavement. This pavement was constructed in 12-foot x 8-inch lanes, with premolded asphalt impregnated paper weakened plane joints and no expansion joints except at bridge paving notches, in conformance with current practice.

Neither the contractor nor the resident engineer was satisfied with his previous experiences with the paper weakened plane joints and, together,

they evolved a modified placing procedure to overcome the tendency for dips at the joint and the tendency toward wavy joints.

Joint Problems

The changes were few and simple, but provided vastly superior results. The principal change was to add an ejector device to the placing iron to eject the paper strip when in proper position. This prevented any tendency for the joint to rise when the iron was withdrawn and the even pressure on both sides of the strip as the strip was ejected and the setting iron withdrawn acted to maintain a vertical and straight strip in its proper position, one-quarter inch below pavement grade.

Another change that contributed greatly to the smooth qualities of the joint was in finishing technique and consisted of simply adding sufficient low water content concrete taken from the mixer to either side of the joint, to force out the wetter material caused by the pounding and working of the notching iron. The concrete was added ahead of the final finishing machine and resulted in a smooth riding joint with uniform strength concrete on either side of the paper strip.

Two of the freeway structures, the Butler overcrossing and the pedestrian overcrossing, were constructed under this contract. The pedestrian overcrossing is unique, in that it has a clear span of 120 feet. This span required reinforcement as high as 230 pounds of steel per cubic yard of concrete in the span slab.

Major Items

Illustrating the vast requirements of modern freeway construction is the fact that the pavement placed for the 2.1 miles under Contract 04TC42-F, including necessary outer highways, would be sufficient to construct 7½ miles of the old standard pavement consisting of one 11-foot lane in each direction.

Following are the approximate quantities of the major items of work on this most recent contract:

Roadway excavation	233,000 cu. yds.
Structure excavation	10,000 cu. yds.
Overhaul	2,000,000 sta. yds.
Imported backfill material	29,000 tons
Imported base material	45,000 cu. yds.
Crusher run base	37,000 tons

In Memoriam

ROY C. PAYNE

ROY C. PAYNE, Associate Highway Engineer, passed away in San Diego on March 4, 1949, after an illness lasting several months.

He was born on June 27, 1885, in Webster City, Iowa, and obtained his education in that city.

His early working days were spent in Seattle, Washington, as foreman and inspector for the Barber Asphalt Paving Company; for the City of Seattle; and for King County.

Mr. Payne was first employed by the Division of Highways as Assistant Resident Engineer in District VII on November 19, 1923. He was later transferred to District VIII, where he was promoted to Associate Highway Engineer. He was assigned to District XI when it was first formed in 1933. His entire career in the division was spent on construction work, during which time he was resident engineer on many large highway projects.

Mr. Payne is survived by his widow, Mrs. Mary D. Payne, and three daughters, Patricia A. Payne of San Diego, California; Mrs. Leslie M. Cash of Susanville, California; and Mrs. Walter F. Cleary of Riverside, California.

A host of friends and co-workers deeply regret his passing and extend their greatest sympathy.

Plant-mixed surfacing	14,250 tons
Cl. "B" PCC pavement	11,600 cu. yds.
Cl. "A" PCC structure concrete	1,300 cu. yds.
Reinforcing steel	235,000 lbs.
Structural steel	300,000 lbs.
R.C.P. (all sizes)	4,600 lin. ft.
C.M.P. (all sizes)	3,300 lin. ft.
Electrical conduit	5,800 lin. ft.
Sprinkling system (all sizes)	15,200 lin. ft.

This section of highway was opened to through main line traffic on January 28, 1949.

As previously stated, the Guy F. Atkinson Company of San Francisco was the contractor on Contract 04TC42-F. The work was done under the direction of Assistant State Highway Engineer Jno. H. Skeggs, Assistant District Engineer R. P. Duffy, District IV, with W. G. Remington, resident engineer, in direct charge of the work.

Bridge Program

Continued from page 34 . . .

ers and immediately beneath the center line of the deck.

Excellent Falsework

Heavy falsework bents were built in the carpenters' yard during the rainy season and moved into position by crane after driving of falsework piles. A full-scale layout of the girders was also made, and both falsework stringers and girder forms were shaped to fit the curves. This procedure resulted in an excellent fit of falsework and forms during construction, without the use of excessive blocking and wedging.

Forms for the piers, 58 feet wide and 32 feet high, were prefabricated in sections and erected by crane, and concrete was placed in a single eight-hour pour of about 150 cubic yards for each pier, using a one-yard bottom-dump bucket lifted by crane, and elephant trunks for placing.

In excavating for the pier footing at the toe of the levee on each side of the river, it was necessary to remove heavy derrick stone about seven feet in depth—fortunately not grouted—before driving of cofferdams. Due to scarcity of steel sheeting, most of the cofferdams were of salvaged 4-inch x 14-inch timbers, driven edge to edge with a steam-operated McKiernan-Terry No. 6 hammer, cable suspended from the boom of a crawler crane.

River Bed Shifted

Water in the river bed was shifted to a prepared channel as work progressed, so that all footing operations were conducted from dry land.

Design, construction supervision, and a majority of the required testing of materials were performed by engineers of the Los Angeles County Road Department, Bridge Division, and Road Construction Division.

The contract, comprising the four-lane reinforced concrete bridge, with approach ramp and outer service roads on the east end was awarded August 29, 1947, to the H. B. Nicholson Co. of Pasadena. Work was started September 25, 1947, and completed January 11, 1949. The final construction cost, excluding engineering, was approximately \$380,000.

California Leads West

Continued from page 33 . . .

Traffic Safety Contest. The National Safety Contest Committee of Judges served as the award committee for the Institute of Traffic Engineers. Three of the members of this body are members of the institute: Thomas H. MacDonald, Commissioner, U. S. Public Roads Administration, Chairman; Norman Damon, Automotive Safety Foundation, and Leslie J. Sorenson, Traffic Engineer, City of Chicago.

According to Robert A. Mitchell, President of the Institute of Traffic Engineers, cities and states eligible for the institute's award must show that traffic engineering responsibility has definitely been assigned by ordinance, resolution or executive order. The awards are made to stimulate greater interest in the need for taking inventory of traffic engineering activities in every city and state. The annual inventory will be the basis for the Annual Progress Report of the President's Highway Safety Conference.

In the eastern region New Jersey won first place and New York placed second. Minnesota and Michigan tied for first place in the midwestern region. No award was made this year in the southern region as the result of a recommendation by the board of judges to eliminate from consideration all states and cities with less than a 70 percent rating on the traffic engineering section.

The western approach ramp and outer service roads are located partially within the city limits of Bell, and have been awarded as a separate contract, financed by Los Angeles County funds.

Preliminary and construction engineering were under the over-all supervision of O. F. Cooley, County Road Commissioner, and directed by S. R. Kennedy, County Bridge Engineer. The county was represented on the contract by the writer, who was Resident Engineer. The Public Roads Administration and the Division of Highways cooperated with the county in the construction of the project.

New Crossing

Continued from page 32 . . .

way width between the 1-foot, 9-inch curbs is 26 feet. The railing will be the steel tubular type.

The reinforced concrete and steel structure, 478 feet long with approach fills at each end, is on a level grade for the greater part of its length and rises at the south end on a short vertical curve. At the north end the bridge deck flares outward to provide a smooth transition for the right-angle junction of State Sign Routes 1 and 28.

Spaced 18 feet, 6 inches apart, the two seven-foot deep, 326-foot girders are continuous over three piers and cantilever beyond the end piers. The cantilever portion tapers from its full depth at the end supports to the depth of the rolled beam approach spans. Each girder has seven splice sections.

Reinforced concrete piers, which support the plate girders, are founded on timber piles. For the foundation of the abutments and the bent, concrete piles, pre-cast on the job, are driven.

The steel was delivered directly to the point of erection by truck. Girder sections were transferred from the trucks which backed onto the falsework trestle, by a truck crane operating from the falsework.

The 365 tons of steel, delivered in 20 shipments, were erected and riveted in 25 working days by the fabricator. The sections over the piers weighed 27 tons, necessitating special permits and arrangement to haul them to the job in one piece.

The concrete deck is 10½ inches thick at center of roadway with a 13½-inch thickness at the girders. Deck concrete was placed with buggies operating from timber plank runways.

It is anticipated that the structure and its 0.8 mile of approaches will be completed this summer. Its completion will eliminate an inadequate old timber truss bridge and will modernize one more link in the Coast Highway.

DRIVER RESPONSIBILITY

Traffic laws, enforcement and highway engineering are all vitally important to traffic safety, but in the final analysis the prevention of traffic accidents rests with individual drivers.

Desert Snows

Continued from page 16...

the cleared roadway in some locations. Drifting was most troublesome at the higher elevations. Some occurred, however, on highways at elevations of three thousand feet or less. On the Waterman Canyon-Big Bear Lake Highway between the Burnt Mill Maintenance Station and Running Springs the highway is located on or near the summit of the mountain for a distance of approximately four miles. Due to the high winds and drifting of snow in this area during storms, maintenance crews have often called this location "No Man's Land."

In the mountain areas during the month of February the snow was ridged along either side of the highway to such a depth that the clearing of the roadway or further widening became more difficult with each succeeding storm.

Heavy Winter Traffic

Conditions throughout the mountain areas were very favorable for snow sports, which attracted large crowds especially on the week ends. During the summer season of 1948, from June until September, the average Sunday traffic on the Waterman Canyon-Big Bear Lake Highway amounted to approximately twelve thousand cars. During the period from December 5, 1948, to March 20, 1949, the average Sunday count was approximately five thousand cars, or 40 percent of the average summer season Sunday traffic.

Throughout the summer season conditions are favorable for the handling of a maximum amount of traffic, since all available parking areas are open for use. During the past winter season the interval between storms was of such short duration that the full use of all snow removal equipment was necessary to keep the traveled way in suitable condition for public traffic. Following the most severe storms many parking areas were covered with a snow pack. Due to the fact that the snow sports are carried on in somewhat definite areas, the handling of such an amount of traffic further complicated the operations of our snow removal equipment.

Mineral Show

Continued from page 43...

in one-inch increments. The faces of the jaws are drilled and tapped for five-sixteenths inch standard set screws on one-inch centers over the entire face, thus providing a secure hold on irregular specimens. The speed of the cutting edge on the 20-inch blade is about two thousand two hundred feet per minute and a six-inch diameter specimen can be cut in about six minutes. Slices as thin as one-sixteenth inch have been cut without difficulty when the material was sufficiently dense and sound. The saw is normally operated with the blade dipping about one inch into a mixture of kerosene and oil.

State to Exhibit

During the convention, trained personnel of the department will display the saw and demonstrate its operation to the public. In addition to the saw, there will be on display the cut sections of concrete cylinders as used in the research work and cut sections of rocks and minerals found in road building aggregates. Also on display will be petrographic equipment, foundation exploration equipment and rock cores, such as are obtained in determining foundations of large structures. The California Division of Highways' exhibit will be under the supervision of Eldridge D. Drew, Assistant Engineering Geologist of the Materials and Research Department.

Between December 4, 1948, and March 31, 1949, storms occurred on either Saturday or Sunday, and in most cases on both days for a total of eight times. In addition, on four week ends, including Saturday and Sunday, the use of snow removal equipment in the mountain areas was necessary.

Due to the efforts of our maintenance personnel, supplemented by rented equipment, there were no road closures for any length of time. During the two most severe storms, truck traffic was restricted over some routes for short periods due to icy conditions. Passenger car traffic was also restricted for a few hours at locations where high winds caused drifting, making temporary closures necessary.

The convention will be held in the Machinery Building and Governors Hall at the State Fair grounds in Sacramento.

The purpose of the convention is to bring together those interested in minerals and the allied subjects and to demonstrate to the public the beauty, as well as utility of rocks and minerals and the skill of those interested in shaping and polishing the products of nature.

First Time in West

Of interest to many Californians, and particularly to the people of Sacramento, is that this will be the first time the American federation has had a convention on the West Coast.

Mineral societies (of which in California there are 49 in the year '49) and individuals from various parts of the country will display their needs in minerals and equipment. Lecturers from various parts of the states will talk on geology and other related subjects.

Like other conventions meeting in '48, '49 and '50, the centennial theme is to be followed, and "early Western" garb is invited but not required. Gold panning contests and other entertainment will add to the pleasure of those who attend.

For those who are interested, and particularly for those of out-of-State or distant points of California, a conducted tour is planned to travel over part of State Highway 49 through some of the "Mother Lode" country to Coloma, where Marshall's discovery of gold started the gold rush to California. A local trip, covering the points of interest in Sacramento, is also planned.

Gold Specimens

For those who have the idea that all the gold is now buried in Fort Knox, Kentucky, it is expected that there will be some very fine displays of gold at the convention, including the display of the Division of Mines, valued at a quarter million dollars.

As another feature of the convention, every visitor registering from outside of California will be given a bag of California rocks and minerals.

The public is invited, and it is estimated that the attendance will exceed fifteen thousand.

Santa Rosa

*New Freeway Opened to
Traffic With Ceremonies*

By H. C. FARRIS, Associate Highway Engineer

WITH MORE than a thousand Santa Rosans and their neighbors, augmented by state, county, and city officials, in attendance, the new Santa Rosa Freeway was officially dedicated on May 20th, just a year to the day from the time the project was started.

Ceremonies were under the auspices of the Santa Rosa Chamber of Commerce. Ralph Stone, president of that organization, acted as master of ceremonies, and State Senator F. Presley Abshire formally opened the new highway to traffic when he cut the ribbon stretched across the freeway.

Mayor Robert L. Bishop epitomized the short addresses delivered by various officials when he said:

"This freeway is a great improvement from the standpoint of traffic safety and of moving traffic through the city."

The California Highway Commission was represented by Commissioners F. W. Sandelin of Ukiah, Chester H. Warlow of Fresno, and George Sav-



*Assistant State Highway Engineer Jno. H. Skeggs
addressing audience at dedication ceremonies*

age, secretary. Among the speakers were Col. Jno. H. Skeggs, Assistant State Highway Engineer, San Francisco, who supervised the building of the freeway; George Kennedy, Chairman of the Sonoma Board of Supervisors; Frank Luttrell, Chairman of the Highway Committee, North Coast Section, California State Chamber of Com-

merce; Albert Beecher, President of the Redwood Empire Association, and Charles Reinking, Golden Gate Bridge and Highway District.

In addition to the speakers, special guests at the ceremony included Ed Elliott, representing Stolte Co., contractors; Lyman Gillis and Howard Ferris, resident engineers; R. R. Duffy, construction engineer; Supervisors James Lyttle, Victor Anderson, Richard Miller, and Joseph Cox; County Engineer Marshall Wallace, City Manager E. W. Blom, City Councilmen Steve Yaeger and Ward Von Tillow; City Engineer Frank Sarles; Harry S. Graham, vice president, Redwood Empire Association; Golden Gate Bridge directors Ed Kenney, Gerald Haggerty and George P. Anderson; Henry Lyon, senior highway engineer, United States Public Roads Administration; A. M. Lewis, secretary-manager, Santa Rosa Chamber of Commerce; V. M. Moir, manager, North Coast region, California State Chamber of Commerce;

New freeway looking south at Sebastopol Avenue



Clyde Edmondson, general manager, Redwood Empire Association; Harold Eckart, chairman of the hotel and resort committee, Redwood Empire Association; Robert Madison and J. A. Tedford, Santa Rosa mayor and city manager, respectively, at the time the project was authorized, and L. G. Hitchcock, member of the State Highway Commission at that time.

ing; the pins would be set here and there until the line had been run. The standard reata of plaited rawhide was 66 feet long, but in wet weather it stretched and in hot, dry seasons contracted, making a large seasonal variation in the length of measurements.

Sonoma County's highway system today coincides almost entirely with the trails used by the Indians. The ex-

Square and was a considerable hazard. However, it will not interfere with those wishing to enter the business district, as the more important cross streets have access across the freeway and the intersections at the southerly and northerly termini are well channeled for traffic wishing to enter or leave the city by the old route. Furthermore, outer highways were con-



Aerial photo looking north from intersection of new freeway and existing highway south of Santa Rosa. This was taken in October, 1948, when grading was completed and paving started north of Santa Rosa Creek only, and clearly shows the new freeway in comparison to the old route through town

When Commandante Vallejo did the first surveying in the County of Sonoma in 1835, to use the poetic language of a scribe of one-half century ago, "Roads there were none, save the divergent trails which twisted through the luxuriant growth of wild oats."

Surveying in that early day was hardly along the scientific lines we use in the highway system today. Using a small pocket compass Commandante Vallejo set the compass and took his bearings from a high hill, a large tree or other conspicuous natural objects; the surveyor would send his assistants on horseback, carrying a long reata, or lariat, instead of a chain, and pins long enough to be driven without dismount-

ceptions are roads connecting with the original natural thoroughfares after government surveys had divided the land into sections and subdivisions.

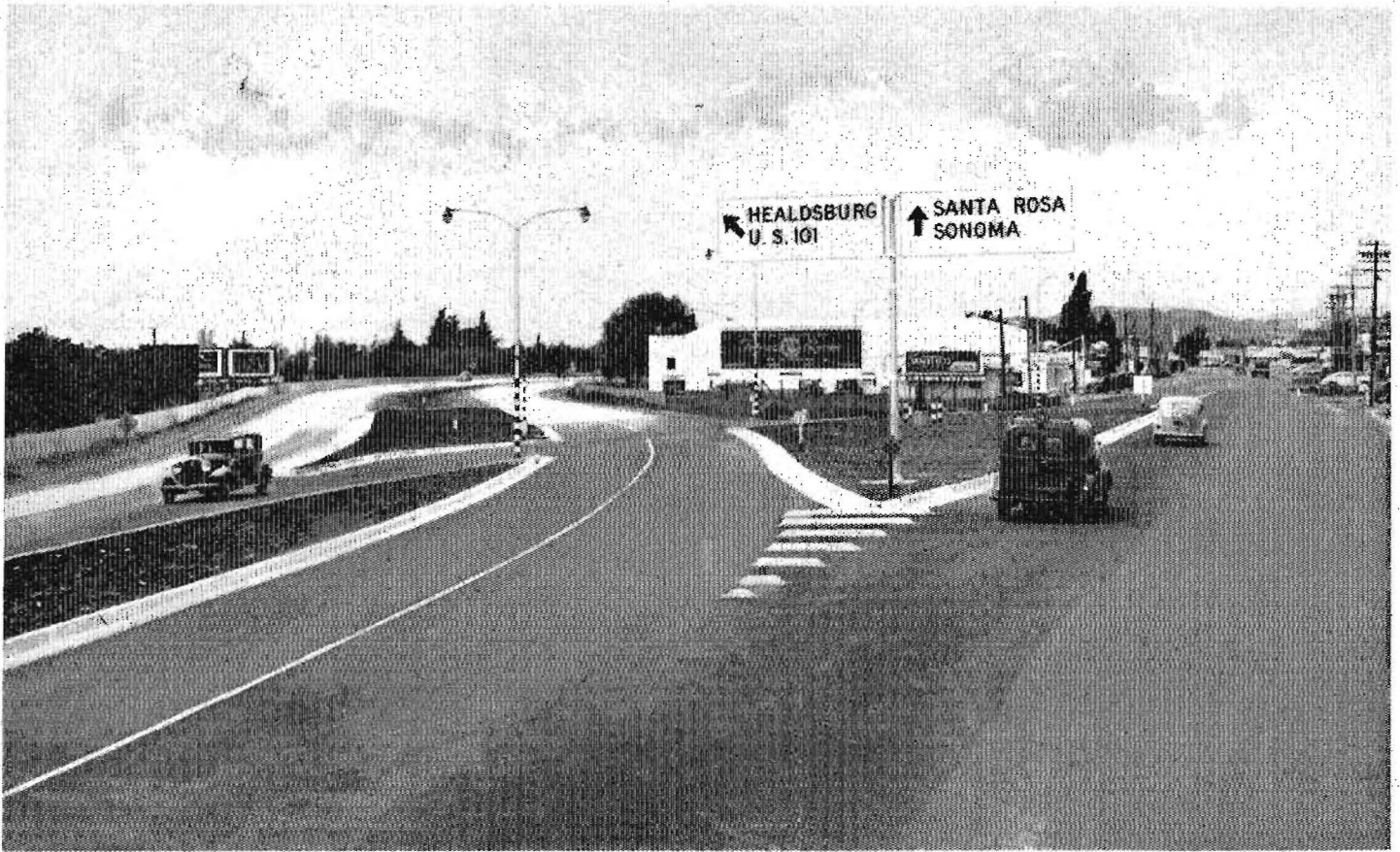
Contemplating the past, the present and the future glory of Sonoma County, the vital part in which roads and highways have played in the development of this magnificent commonwealth is self-evident. The recently completed Santa Rosa Freeway project is a very important link in the ultimate plans for furthering this development.

The freeway has delivered the congested business district of Santa Rosa from the heavy Redwood Highway traffic which circled the Courthouse

constructed adjacent to the freeway where other facilities did not provide access to adjacent properties.

Starting 0.7 of a mile south of the Santa Rosa city limits the new alignment is west of the former location and through the westerly portion of the City of Santa Rosa and continues north of the city to return to the old route two miles north of the city limits. The total length of the project is 4.3 miles.

Axle weight distribution data for this highway demanded a base and pavement design of the heavy industrial type and the design consists of two 24-foot strips of Portland cement concrete pavement on 11 inches of imported base material, the top four



UPPER—Santa Rosa Avenue looking north at southerly intersection. LOWER—Santa Rosa Freeway looking south at intersection of Ridgeway Avenue

inches of which was treated with 3 percent to 4 percent of portland cement. A division strip 36 feet wide is provided between the traveled ways.

Adequate shoulders, consisting of plant-mixed surfacing and asphaltic penetration were provided for the rural portion of the project. Portland cement concrete curbs and gutters border the traveled ways (including speed change and storage lanes) and shoulders within the city and urban areas.

Two Concrete Bridges

Included in the project were two parallel reinforced concrete bridges over Santa Rosa Creek, each 139 feet in length and 32 feet wide between curbs; and a pedestrian underpass at the Luther Burbank School.

There were 67 items in the contract and it is believed that a few of the major ones may be of interest to some readers. They are as follows:

5,300 cubic yards removing concrete
90,000 cubic yards imported borrow
150,000 tons imported base material
22,000 tons crusher run base
111,000 square yards mixing and compacting (cement treated subgrade)
5,400 barrels Portland Cement (cement treated subgrade)
12,000 tons plant-mixed surfacing
26,000 cubic yards Portland Cement Concrete pavement
2,200 cubic yards Portland Cement Concrete structures
370,000 pounds bar reinforcing steel
1,200 cubic yards sacked concrete riprap
2,700 cubic yards Portland Cement Concrete curbs, gutters, sidewalks and driveways
9 miles of chain link and property fence
2.4 miles of reinforced concrete pipe culverts

Ahead of Schedule

The contractor diligently prosecuted the work and completed his contract approximately three months ahead of schedule. The following daily average production figures may be of interest to those engaged in the construction industry:

3,200 cubic yards imported borrow
6,000 tons imported base material
4,300 square yards mixing and compacting a 4-inch depth of cement-treated subgrade between pavement headers 12 feet apart
600 cubic yards Portland Cement Concrete pavements
50 cubic yards Portland Cement Concrete curbs, gutters and sidewalks
850 lineal feet chain link fence

In securing the necessary rights of way for construction of this project, 200 separate parcels had to be acquired, including 114 dwellings, housing 150

families. Some ninety-two houses were moved and 22 were wrecked. Many utility facilities, both publicly and privately owned, had to be relocated to clear construction.

Stolte, Inc. and Duncanson-Harrelson Company of Oakland were the principal contractors and bid the job as a joint venture. Mr. E. W. Elliott was project manager. The contract was administered by District IV of the Division of Highways, with L. R. Gillis as resident engineer during the first half of the contract and H. C. Farris during the last half. The electrical portion of the signal and lighting system was let to H. S. Tittle Co. of San Francisco. Guy H. Heberling was the resident engineer for this portion of the project. The work of landscaping the project will be let to contract in the fall of this year.

The summary of costs for the project is as follows:

Rights of way.....	\$950,000
Grading, paving and structures	1,400,000
Signals and lighting	38,000
Landscaping	50,000
Engineering	142,000
	<hr/>
	\$2,580,000

Cost per mile—\$600,000

Huge Job

Continued from page 47 . . .

Old Houses Modernized

The accompanying photographs, showing the residence buildings in their existing location, also in their new location after rehabilitation, bear out our statement that without exception these buildings are in much better condition and represent far superior housing facilities after relocation than before. In general, they have been modernized, both inside and out, and after relocation are on a better foundation.

The buildings are inspected from roof shingles to floor joists by the local building and safety department, and any unsafe conditions, including wiring or plumbing, are corrected or replaced. In many instances, you would not recognize the old building after the moving and face-lifting operation has been completed. The way in which the tenants have been cared for and the manner in which the structures have been relocated is conclusive evidence that the unique technique used by the Right of Way Department has been very successful.

In Memoriam

MICHAEL J. BURNS

An ardent advocate of modern highways for California State Senator Michael J. Burns of Humboldt County died suddenly on May 1, 1949, in Sacramento. Elected to the Assembly in 1932 Mr. Burns served continuously in the lower house of the Legislature until this year when he succeeded former Senator Irwin T. Quinn of Eureka, who retired.

As an assemblyman Senator Burns was credited with winning the bitter fight for passage of the Collier-Burns Highway Act in the lower house in 1947. As a result of his interest in highway affairs, Senator Burns was made a member of the Senate Transportation Committee this year.

When informed of the death of Senator Burns, Governor Earl Warren said, "Our State Government has lost one of its finest legislators in the passing of Michael J. Burns of Eureka. His independence of spirit and his constant concern for the public welfare characterized his long career. In recent months his strict adherence to duty in spite of illness without doubt shortened his very useful life.

"Those of us who knew him and worked with him have lost a true friend and the public a devoted public servant."

Senator Burns was born in County Waterford, Ireland, September 7, 1887, and was educated in Irish schools.

He entered the engine room department of the British Royal Navy and came to America in 1909. He settled in Eureka, Humboldt County, and became a machinist and a master mechanic.

He was a member of the machinist's union, the Knights of Columbus, Elks, Eagles and the Grange.

Surviving are his widow, Mrs. Millie Agnes Maxwell Burns, six children and six grandchildren.

EARL WARREN
Governor of California

CHARLES H. PURCELL
Director of Public Works

FRANK B. DURKEE
Deputy Director

HIGHWAY COMMISSION

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HARRISON R. BAKER Pasadena
HOMER P. BROWN Placerville
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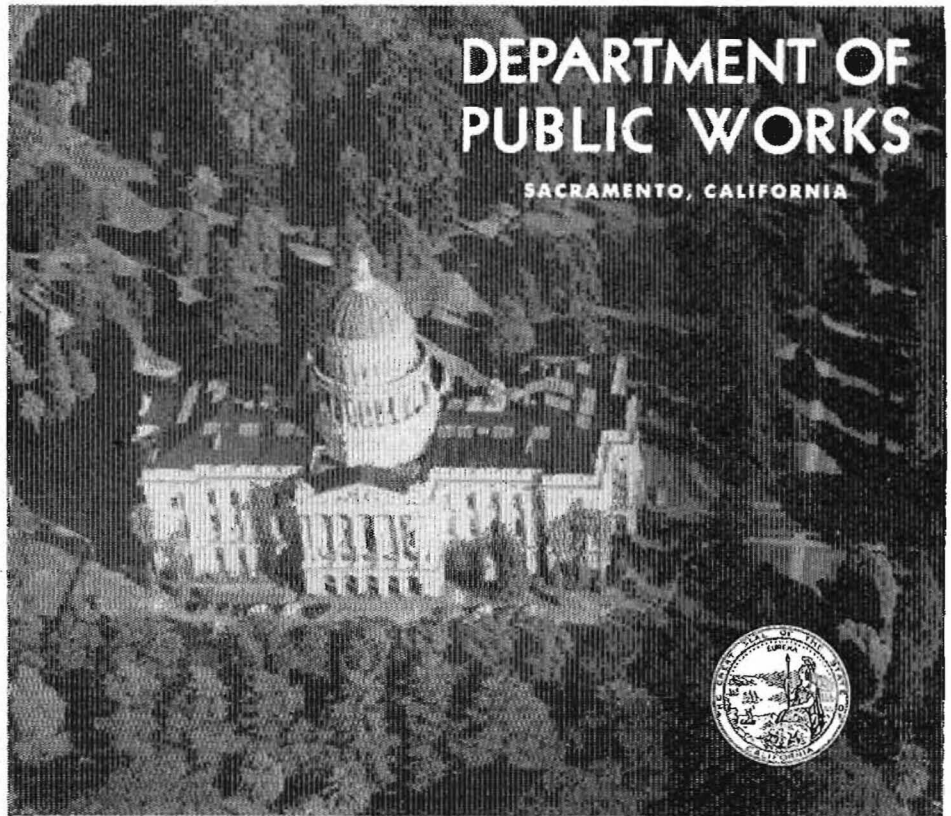
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R. S. J. PIANEZZI Assistant Chief
E. M. MacDONALD Assistant Chief

District IV

JNO. H. SKEGGS Assistant State Highway Engineer

District VII

S. V. CORTELYOU Assistant State Highway Engineer



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T. B. WADDELL Principal Hydraulic Engineer, Central Valley Project
G. H. JONES Principal Hydraulic Engineer, Sacramento River Flood Control Project
W. H. HOLMES Principal Engineer, Design and Construction of Dams, Supervision of Dams
P. H. VAN ETEN Principal Hydraulic Engineer, State-Wide Water Plan
GEORGE B. GLEASON Supervising Hydraulic Engineer, Los Angeles Office
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DIVISION OF ARCHITECTURE

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W. K. DANIELS Assistant State Architect (Administrative)
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H. W. DeHAVEN Supervising Architectural Draftsman
D. C. WILLET Chief Construction Engineer
CARLETON PIERSON Supervising Specification Writer
FRANK A. JOHNSON Principal Structural Engineer (State Buildings)
C. A. HENDERLONG Principal Mechanical and Electrical Engineer
WADE HALSTEAD Supervising Estimator of Building Construction