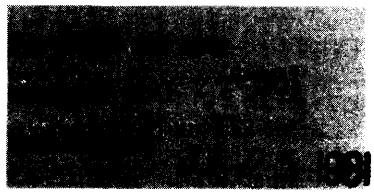
FHR-8-300 (11-78)

United States Department of the Interior
Heritage Conservation and Recreation Service

National Register of Historic Places Inventory—Nomination Form



See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Lower Blackburn Grade Bridge

and/or common 18-Mile Bridge / Van Duzen River Bridge / Bridge No. 4-97

2. Location

street & number California State Highway 36, Post Mile 18.74 ___ not for publication

city, town Bridgeville ___ X vicinity of **congressional district** 2

state California **code** 06 **county** Humboldt **code** 023

3. Classification

Category	Ownership	Status	Present Use	
___ district	X public	X occupied	___ agriculture	___ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
X structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	___ yes: restricted	___ government	___ scientific
	___ being considered	X yes: unrestricted	___ industrial	X transportation
		___ no	___ military	___ other:

4. Owner of Property

name California Department of Transportation (CALTRANS)

street & number 1120 N Street

city, town Sacramento ___ vicinity of **state** California

5. Location of Legal Description

courthouse, registry of deeds, etc. CALTRANS Office of Structures Maintenance

street & number 1120 N Street, Room 3303

city, town Sacramento **state** California

6. Representation in Existing Surveys

title An Evaluation of Van Duzen River Bridge on 01-Hum-36, P.M. 18.74 **has this property been determined elegible?** X yes ___ no

date November 1979 ___ federal X state ___ county ___ local

depository for survey records California Department of Transportation

city, town 1120 N Street, Sacramento **state** California

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	X unaltered	X original site
X good	___ ruins	___ altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Lower Blackburn Grade Bridge across the Van Duzen River on State Highway 36 is described as comprised of reinforced concrete slab approach spans and a reinforced concrete through arch main span. It utilizes reinforced concrete two-column bents and reinforced concrete seat abutments, all on spread footings. Its eight spans total 258 feet in length, 20 feet in width, and carry a 19.3-foot, two-lane roadway between concrete window-type railings, with no skew.

8. Significance

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion	
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science	
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture	
___ 1600–1699	_X_ architecture	___ education	___ military	___ social/ humanitarian	
___ 1700–1799	___ art	_X_ engineering	___ music		
___ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	___ theater	
_X_ 1900–	___ communications	___ industry	___ politics/government	_X_ transportation	
		___ invention		___ other (specify)	

Specific dates 1925 ENGINEER: John B. Leonard

Statement of Significance (in one paragraph)

During the early 1920s, Route 36 (then known as the Fortuna-Red Bluff Highway) was selected by engineers of the California Highway Commission as the main route between the north coast and the upper Sacramento Valley. It was selected as the most direct route, the easiest to construct and maintain, and the safest to travel. Proceeding inland from Fortuna the road follows the Van Duzen River canyon to a point about ten miles above Bridgeville. The Van Duzen, a tributary of the Eel River, because of the mountainous terrain and heavy rainfall of the region, can experience rapid rises and become a major stream at times. Coupled with this, many of the slopes flanking the river, along which the highway was built, consist of a bluish, serpentine-like material which is slippery and unstable when wet. It was impossible for highway forces to maintain continuous travel along the route during the winter, and several lives were lost. That portion of the route known as the Blackburn Grade was particularly hazardous due to the combination of steep grades, sharp curves, and precipitous slopes.

Shortly after the aforementioned selection of this route by the CHC engineers, the Humboldt County Board of Supervisors began a road improvement program. As part of this program, five bridges were constructed on the Fortuna-Red-Bluff Highway--two in 1923 to eliminate the "Blue Slide" and three in 1925 to eliminate the Blackburn Grade and to replace a covered bridge at Bridgeville. For the design of the bridges, the Board turned to an engineer whose work had been proven in the County a decade earlier. John B. Leonard was hired directly--without bidding for the design contract. Leonard was a consulting engineer from San Francisco, and was possibly the most important early 20th century designer of and proponent of reinforced concrete bridges in California.

John B. Leonard was born in Union City, Michigan on July 18, 1864. His education was in the public schools of Union City, at Michigan State College, at Illinois University, and at the University of Michigan. Leonard earned his own way through college doing various jobs, including teaching.

In 1888 he moved to Los Angeles where he worked in that City's engineering department. In 1889 he came north to San Francisco and spent the rest of his life in the Bay Area. In the years between 1889 and 1903 he was employed in various engineering positions with a number of firms, with a brief independent period in 1898-9 as an engineer specializing in concrete and artificial stone.

Leonard was in the right place, at the right time, to have been aware of the great potential of reinforced concrete as the material of the future. The year of his arrival in San Francisco (1889) also saw the completion of Ernest L. Ransome's Alvord Lake Bridge in Golden Gate Park. This was the first reinforced concrete bridge in the United States (and is still in use). While it may never be known precisely when Leonard became committed to reinforced concrete bridges, one can see that by 1898-9 he had an awareness, and his various employments would also have familiarized him with bridge engineering in general, and with steel bridge engineering (and the limitations thereof) in particular. From its inception in May 1905 through January

9. Major Bibliographical References

Hammill, Harold B., "Five Highway Bridges Across the Van Duzen River, California," Western Construction News, March 25, 1927.

Huber, Walter L., President, A.S.C.E., "An Engineering Century In California," A.S.C.E. Transactions, 1953.

10. Geographical Data

UTM NOT VERIFIED
ACREAGE NOT VERIFIED

Acreage of nominated property less than 1

Quadrangle name Redcrest **Quadrangle scale** 1:24,000

UMT References

	Zone	Easting	Northing
A	10	424610	4448180
B			
C			
D			
E			
F			
G			
H			

Verbal boundary description and justification California State Highway crossing the Van Duzen River, Humboldt County, California, at Post Mile 18.74.

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title John W. Snyder, M.A., Architectural Historian

organization N/A **date** January 21, 1981

street & number 3419 Wemberley Drive **telephone** 916/487-6472

city or town Sacramento **state** California

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national ___ state X local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the Heritage Conservation and Recreation Service.

State Historic Preservation Officer signature [signature]

title SHPO **date** 5/20/81

For HCRS use only

I hereby certify that this property is included in the National Register

Entered in the National Register date 6.25.81

for actg **Keeper of the National Register**

Attest: date

Chief of Registration

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UNITED STATES DEPARTMENT OF THE INTERIOR
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NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

1912 and again for a period beginning in 1924 he served as an associate editor (for reinforced concrete) of Architect and Engineer of California. During the first period Leonard authored a number of articles touting the qualities of reinforced concrete, and had photos of some of his bridges appear in these as well as in articles by others. He carried his commitment to reinforced concrete beyond designing bridges: from 1905 to 1912 he was a sales agent for the Corrugated Bar Company of Chicago, manufacturer of reinforcing steel, and from 1913 to 1917 was sales manager for Pacific Coast Steel, a a major supplier of reinforcing steel.

Following his departure from Architect and Engineer of California in 1912, Leonard and then-partner William P. Day published a book entitled The Concrete Bridge: How It Has Proved Itself In California. In this, the qualities of reinforced concrete for bridge building were again extolled. The various types of these bridges--flat spans (girder type and girderless), filled spandrel arches, open spandrel barrel vault arches, and open spandrel rib-type arches--are discussed. Also mentioned is the fact that these bridges utilized local California products--timber for falsework and forms, cement, aggregate, sand, and reinforcing steel--thus avoiding the delays which often accompanied the building of steel bridges due to the need to ship components in from out-of-state. The book also illustrates no fewer than twenty of Leonard's bridges, about which Leonard called the reader's attention to the "pleasing spring of the arch." His designs reveal a concern for aesthetics, for fitting the design to the site, and for detail. His arch bridges, without exception, reveal graceful parabolic arches rising to a remarkably thin section at the apex. They were used singly or in multiple arch spans such as his landmark Fernbridge over the Eel River in Humboldt County. This book is also singularly unique in that it carries on, in bridge engineering, a tradition of practicing architect to publish pattern books. While Leonard was not an architect, and while this was not literally a pattern book, its relation to this tradition--which dates back at least to the 16th century Italian architect Palladio--is clear. This tradition was not without precedent in California either, as the 19th century architects Samuel and J. Cather Newsom published no fewer than eleven pattern and other books promoting their designs and services. Leonard, however, appears to have been the only consulting engineer of this period to use this approach, and this book remains unique for providing a capsule glimpse of reinforced concrete bridge design in the first decade-and-a-half of the 20th century in California. It is likewise a fine encapsulation of the earlier designs of John B. Leonard.

The Leonard & Day partnership apparently was terminated about 1918, and Leonard continued as a structural engineer. In 1921-22 he participated in work at the test highway at Pittsburg, California where he furnihsed the delicate instruments necessary for measurements. This test highway was notable in that it was one of only two such test roads in the U.S. built with private funds (this one financed by Columbia Steel Company): all other such research effort fell upon the U.S. Bureau of Public Roads. In 1920 he also took on Harold B. Hammill as an employee, and later as a junior partner. Leonard, in association with Hammill, was instrumental in

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devising a method of analyzing an arch by the ellipse of elasticity. This development, which occurred about 1923, was claimed by both men to be quick and accurate, ensuring adequate bridge design. It was during his period of association with Hammill that Leonard designed the five bridges on the Fortuna-Red Bluff Highway.

On May 18, 1928 Leonard was appointed Superintendent of Building Inspection for the City of San Francisco, a position he held until 1934. In 1935 he returned to private practice as a consulting civil and structural engineer. On February 16, 1945 John B. Leonard, holder of California Engineer's Certificate No. 12, died in San Francisco at the age of 80.

Leonard's pioneering efforts in reinforced concrete bridge design have not gone unnoticed. Two of his bridges have been designated Historic Civil Engineering Landmarks by the American Society of Civil Engineers. These are the aforementioned Fernbridge, and the former Mountain Quarries Company railroad bridges over the American River below Auburn, California. The A.S.C.E. recognized the 1911 Fernbridge--2,408 feet long with unprecedented (in California) 180-foot arched main spans--as a landmark in its own time. And the railway bridge was, when built in 1911, the longest span concrete arch railroad bridges owned by a private concern. Further, the Keeper of the National Register of Historic Places has determined the only known non-concrete bridge designed by Leonard to be eligible for inclusion in the National Register. This latter is a steel Pratt truss swing bridge spanning the Sacramento River between Glenn and Butte Counties, California. (Significantly, Leonard's first proposal for this site was for a reinforced concrete bridge. Only after this had been declined by the joint Boards of Supervisors of the two counties, who also called for a steel bridge, did the present design evolve.) Finally, Both the subject bridge and the Blue Slide Bridge on Highway 36 have also been determined eligible for inclusion in the National Register of Historic Places.

The Lower Blackburn Grade Bridge, Bridge No. 4-97, is a structure which has integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, it embodies the distinctive characteristics of a type (reinforced concrete through arch bridge), period (mid-1920s), and method of construction (concrete poured in-place). It may be construed to be the work of a master--John B. Leonard, who was a leading proponent of, and an important and innovative early 20th century designer of reinforced concrete bridges in California. It is one of only two through arch bridges known to have been built to his design, and is the only remaining one of the two. Aesthetically, it reflects Leonard's concern for a pleasing design which was at once functional and well-suited to its setting. It appears to have been one of the last bridge designs executed by Leonard. This bridge has been determined eligible for inclusion in the National Register under criteria A, B, and C, and is now so nominated.

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Janni, A.C., "The Design of a Multiple-Arch System and Permissable Simplifications," A.S.C.E. Transactions, 1924.

Janson, Del Mar, Revised Original Report, Van Duzen River Bridge (unpublished CALTRANS structural report), dated September 4, 1974.

Leonard, John B. and Day, W.P., The Concrete Bridge: How It Has Proved Itself In California, San Francisco, Leonard and Day, 1913.

Snyder, John W., Report on Gianella Bridge on 03-But-32, P.M. 0.00, Sacramento River (unpublished CALTRANS historic report and evaluation), dated December 1, 1977.

_____, America's Highways 1776/1976: A History of the Federal-Aid Program, Washington, D.C., U.S. Department of Transportation, 1976.

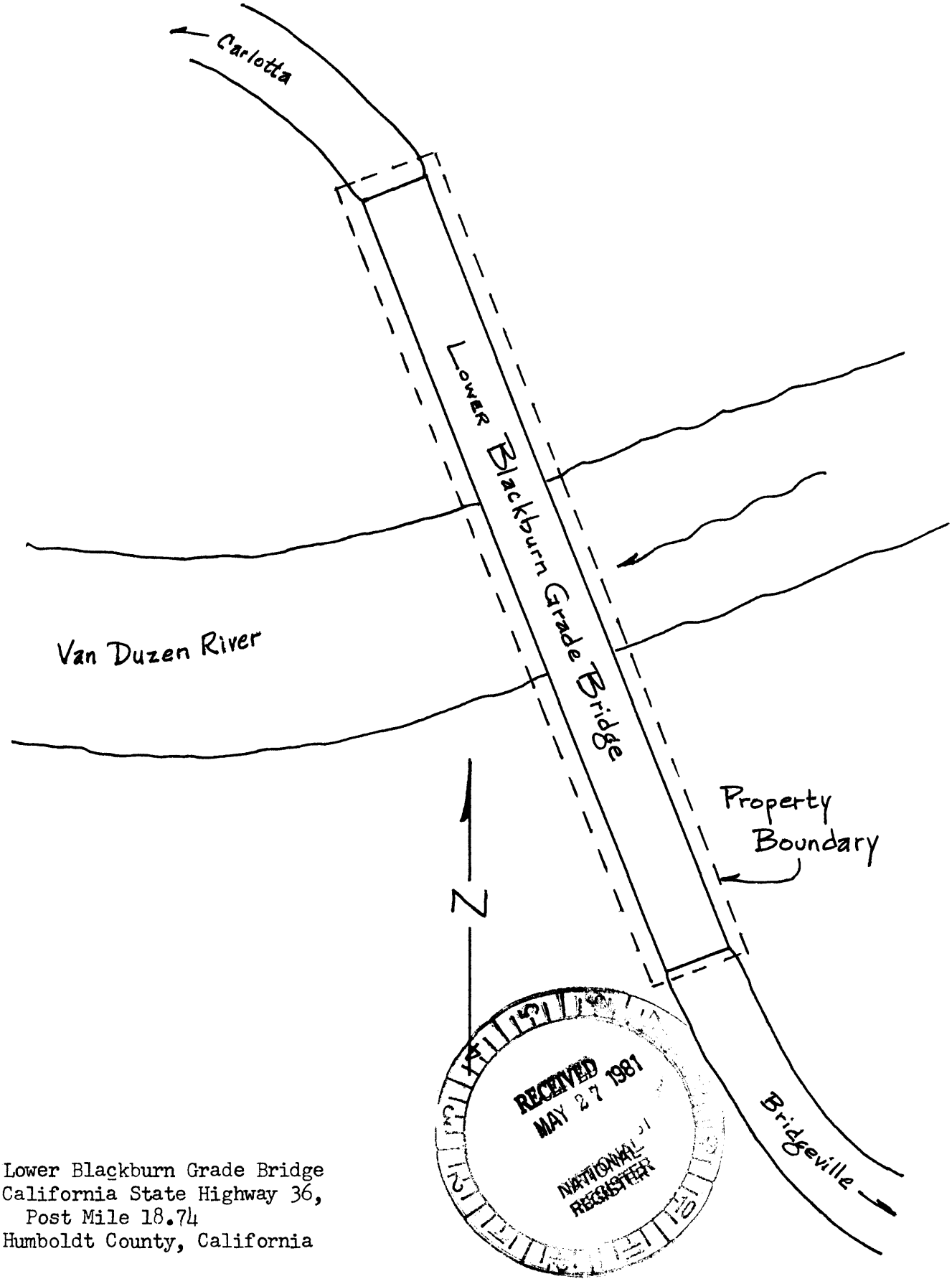
_____, Historic Civil Engineering Landmarks of San Francisco and Northern California, ed. by William A. Myers, San Francisco, Pacific Gas and Electric Company, October 1977.

_____, Historic Civil Engineering Landmarks of Sacramento and Northeastern California, Sacramento, History and Heritage Committee of the Sacramento Section of the American Society of Civil Engineers, 1976.

_____, "Obituaries," San Francisco Chronicle, February 17, 1945.

San Francisco City Directories for the years 1889-1943, inclusive.

Snyder, John W., An Evaluation of Van Duzen River Bridge on 01-Hum-36, P.M. 18.74 (unpublished historic report and evaluation), dated November 1979.



Lower Blackburn Grade Bridge
California State Highway 36,
Post Mile 18.74
Humboldt County, California

Scale: 1" = 43'

JUN 25 1981