

# HISTORIC BRIDGE INVENTORY

## Granite Creek Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	00042
milepost	318.13	inventory route	SR 89 A
location	0.3 mi E Jct SR 89	feature intersected	Granite Creek
city/vicinity	Prescott	USGS quadrangle	Prescott
district	88	UTM reference	12.370057.3831113

### STRUCTURAL INFORMATION

main span number	2	main span type	104
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	43.0	superstructure	concrete three-beam deck girder
structure length	89.0	substructure	concrete abutments, wingwalls and pier
roadway width	20.1	floor/decking	concrete deck
structure width	23.8	other features	steel Thrie beam guardrails

### HISTORICAL INFORMATION

construction date	1922	designer/engineer	Arizona Highway Department
project number	FAP 19	builder/contractor	Windsor, Coleman & King
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	ca1980	alterations	steel Thrie beam guardrails installed

### NATIONAL REGISTER EVALUATION

inventory score	61	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A _____ B _____ C <u>x</u>
		signif. statement	excellent example of early state standard bridge type

### FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign  
420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004

# GRANITE CREEK BRIDGE

Structure No. 0042



## PHOTO INFORMATION

date of photo.: November 2002

view direction:

north northwest

photo no.:

02.11.263 02.11.264



## CONSTRUCTION HISTORY

In 1920 the Arizona Highway Department undertook an improvement of the highway linking Prescott and Jerome. AHD designated this construction as Federal Aid Project 19, to be jointly funded by the state and the U.S. Bureau of Public Roads. Located from Jaeger Canyon to Granite Dells, the route under this project crossed Granite Creek northeast of Prescott. Here State Engineer Merrill Butler designed a concrete bridge with two 42-foot spans supported by concrete abutments and pier. The Granite Creek Bridge featured a 20-foot-wide concrete deck, bounded on the sides by AHD-standard steel pipe guardrails with paneled concrete bulkheads. In 1921 a contract to build the bridge was let to Windsor, Coleman & King of Navajo County. The contractors worked on this bridge and a single-span concrete arch over Lynx Creek [8256] through the remainder of the year, completing the Granite Creek structure in 1922 for a total cost of almost \$12,000. "The credit for the attractive and pleasing appearance of these two bridges," stated the *Prescott Courier* in October 1922, "is due to Merrill Butler, bridge engineer with the Arizona Highway Department who designed both structures." Since its completion, the Granite Creek Bridge has carried traffic on this regionally important state route. Thrie beams have been added at the approaches, but the bridge remains otherwise unaltered.

## SIGNIFICANCE STATEMENT

The State of Arizona had begun using concrete for bridge superstructures as soon as it was formed. The earliest girder bridges, illustrated by the Antelope Hill Bridge [abd.] and the Santa Cruz River Bridge [8166], employed two deep girders that were cast integrally with the concrete deck. In 1919 the highway department developed a set of standard plans for concrete bridges that included slabs and girders. AHD engineers at that time dropped the two-girder design in favor of a new girder with three somewhat shallower beams. "The slab spans become uneconomical for spans greater than about 24'," Butler stated in 1920. "For greater spans, the three girder deck is the more economical up to about 50'." AHD's implementation of this configuration proved short-lived. According to Butler's successor W.C. Lefebvre in 1922, "A set of 4-girder reinforced concrete decks, ranging in span from 20 feet to 40 feet, have been worked up and are being used in the place of the old 3-girder standard plan which has become obsolete. These new spans, although designed for heavier loads than the old, are more economical in materials and have been used exclusively in the past two years where such spans were required." AHD engineers designed only ten three-girder bridges before shelving this standard, and fewer were actually constructed. The Granite Creek Bridge and the Cordes Bridge [8249] appear to be the only three-girder bridges in the state to have survived intact. As such the Granite Creek Bridge is an important, well-preserved example of early AHD design.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☒ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

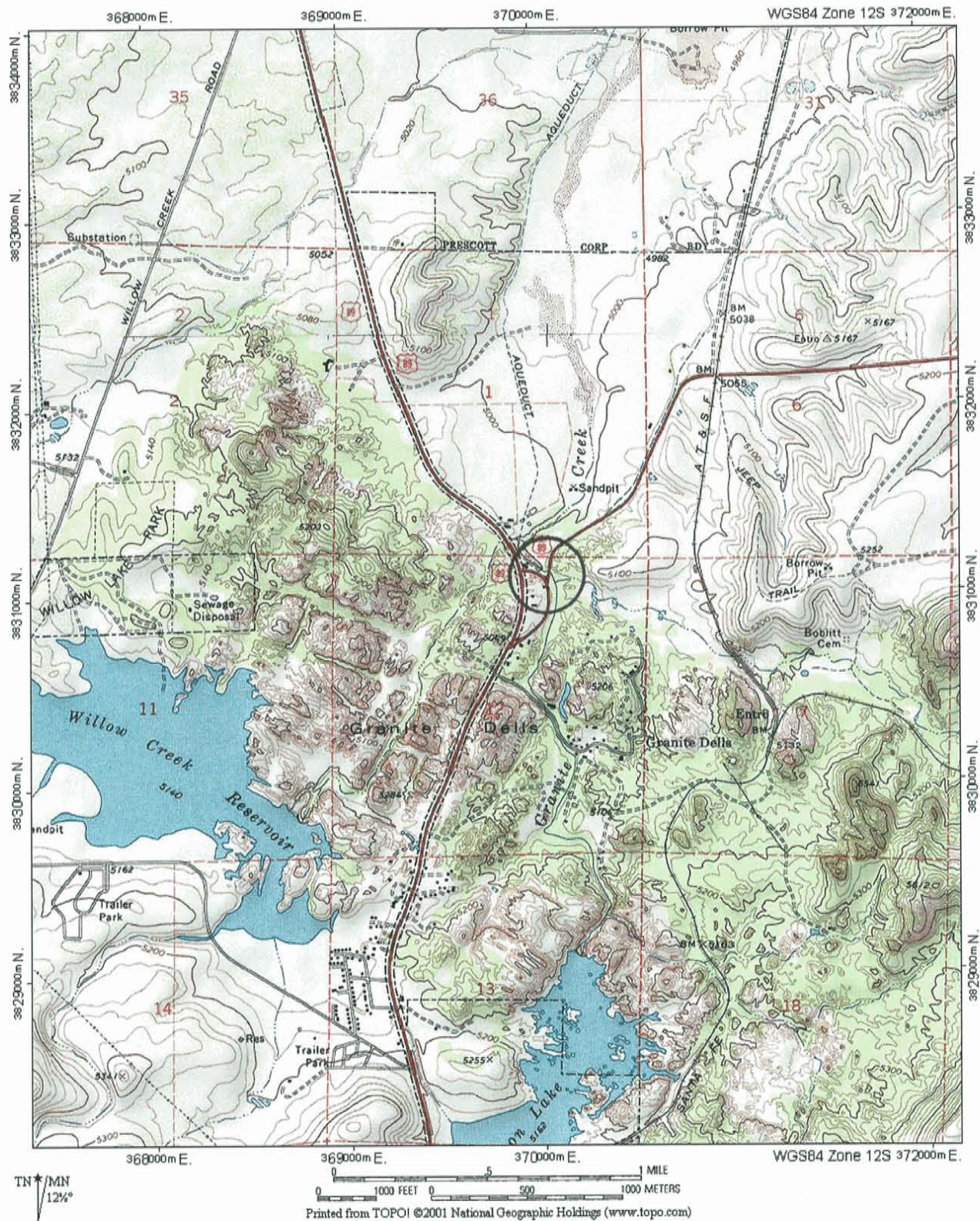
- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
 PERIOD OF SIGNIFICANCE: 1922-1964  
 THEME(S): Transportation: Highways



# GRANITE CREEK BRIDGE

Structure No. 0042



Location Map



# HISTORIC BRIDGE INVENTORY

## Hell Canyon Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	00483
milepost	346.70	inventory route	SR 89
location	17.1 mi S Jct I 40	feature intersected	Hell Canyon
city/vicinity	Drake	USGS quadrangle	Paulden
district	86	UTM reference	12.372964.3873124

### STRUCTURAL INFORMATION

main span number	3	main span type	409
appr. span number	3	appr. span type	402
degree of skew	0	guardrail type	9
main span length	250.0	superstructure	steel rigid-connected cantilevered deck truss
structure length	586.0	substructure	concrete abutments, wingwalls and piers
roadway width	29.8	floor/decking	concrete deck with asphalt overlay
structure width	35.3	other features	concrete Jersey barrier guardrails with Thrie beams at approaches

### HISTORICAL INFORMATION

construction date	1954	designer/engineer	Arizona Highway Department
project number	FI-62(6)	builder/contractor	Dail Engineering & Construction Co., Phoenix AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	1983 1999	alterations	guardrails replaced with Jersey barriers; approach span added

### NATIONAL REGISTER EVALUATION

inventory score	48	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A _____ B _____ C <u>x</u>
		signif. statement	outstanding example of large-scale truss construction

### FORM COMPLETED BY

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Loveland, Colorado 80537  
31 October 2004



# HELL CANYON BRIDGE

Structure No. 0483



## PHOTO INFORMATION

date of photo: February 2003

view direction: southwest south

photo no.: 03.02.10 03.02.11



## CONSTRUCTION HISTORY

In June 1951 the Arizona Highway Department began production of construction drawings for a large-scale bridge that would carry the Prescott-Ash Fork Highway (U.S. Highway 89) over Hell Canyon. Located near Drake in Yavapai County, the proposed bridge would carry the road on a high line over a broad, rocky ravine. As delineated by AHD, the Hell Canyon Bridge was configured as a three-span Pratt deck truss with riveted connections. The distance between the superstructure and the riverbed below was too great to allow for traditional erection falsework, so AHD designed the Hell Canyon Bridge as a cantilever truss, with a long central span counterbalanced on either end by shorter anchor spans. The center span extended 250 feet over the river's main channel; the approach spans extended 75 and 150 feet, respectively and were in turn approached by 40-foot steel girders. The superstructure was held aloft by concrete pedestals on spread footings. The trusses and girders carried a concrete deck on steel stringers, which was bounded on both sides by aluminum guardrails.

For logistical reasons, AHD divided the construction into three separate contracts. The substructure (Project FI-62(6)) was let in March 1952, the steel superstructure (non-Federal Aid Project 62 (1953)A) in September 1952, and the deck and guardrails (non-Federal Aid Project 62 (1954)A) in November 1953. The Dail Engineering & Construction Company of Phoenix erected the trusses, and the bridge was completed in 1954 for an aggregate cost of almost \$325,000. It has carried highway traffic since, with the addition of a steel approach span and the replacement of its guardrails with Jersey barriers as the most notable alterations.

## SIGNIFICANCE STATEMENT

As a pivotal crossing on a regionally important route, the Hell Canyon Bridge enjoys a degree of significance for its contribution to southern Arizona transportation. The bridge's relatively late construction limits this significance, however. The structure is technologically important as a well-preserved example of large-scale bridge construction. Arizona erected a number of massive steel arches and cantilevered steel deck trusses in the 1940s and 1950s, most of which are impressively scaled spans placed in dramatic settings. A handful of these remain: the Queen Creek Bridge [0406] in Pinal County and the Pinto Creek Bridge [0351] in Gila County representing the arches, and the Hell Canyon Bridge, Guthrie Bridge [0352] in Greenlee County, and the Cameron Bridge [0532] in Coconino County representing the trusses. These were the state's most striking bridges of post-War period. With its clean proportions and grand scale, the Hell Canyon Bridge numbers among Arizona's most spectacular steel spans.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☐ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☐ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

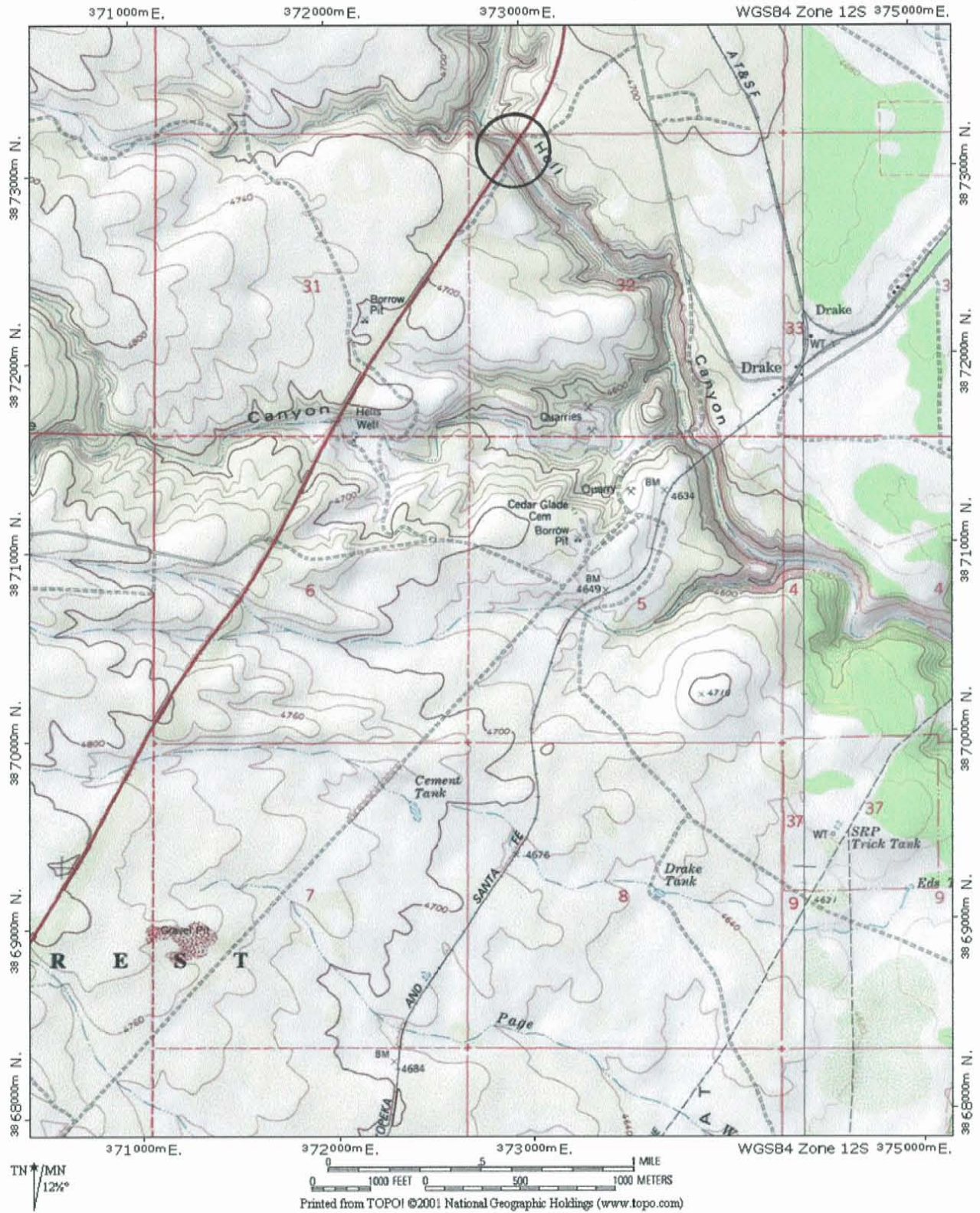
- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
 PERIOD OF SIGNIFICANCE: 1954-1964  
 THEME(S): Transportation: Highways



# HELL CANYON BRIDGE

Structure No. 0483



Location Map

# HISTORIC BRIDGE INVENTORY

## Black Canyon Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	00758
milepost	209.88	inventory route	SR 260
location	8.8 mi N Jct I 17	feature intersected	Black Canyon Wash
city/vicinity	Bridgeport	USGS quadrangle	Cornville
district	88	UTM reference	12.410860.3837712

### STRUCTURAL INFORMATION

main span number	2	main span type	403
appr. span number	0	appr. span type	
degree of skew	25	guardrail type	8
main span length	90.0	superstructure	welded steel deck girder
structure length	184.0	substructure	concrete abutments, wingwalls and pier
roadway width	30.0	floor/decking	concrete deck
structure width	35.6	other features	variable depth girders; solid concrete guardrails with aluminum tubes and steel Thrie beams

### HISTORICAL INFORMATION

construction date	1963	designer/engineer	Arizona Highway Department
project number	S-326(3)	builder/contractor	Copper State Construction Company, Mesa AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	1980 1997	alterations	Thrie beams added to original guardrails; scour protection built

### NATIONAL REGISTER EVALUATION

inventory score	48	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A _____ B _____ C <u>x</u>
		signif. statement	well-preserved example of welded steel construction

### FORM COMPLETED BY

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Loveland, Colorado 80537  
31 October 2004



# BLACK CANYON BRIDGE

Structure No. 0758



## PHOTO INFORMATION

date of photo: November 2002

view direction: north east

photo no.: 02.11.263 02.11.270

## CONSTRUCTION HISTORY

Late in 1960 the Arizona Highway Department began planning for substantial new bridges over Black Canyon and Wilbur Canyon [0781], north of Camp Verde. The road between Camp Verde and Cottonwood had been in use for decades, and the existing structures at these crossings had deteriorated to the point of replacement. As delineated by AHD engineers, the replacement structure at Black Canyon would be comprised of two long steel girder spans—each 90 feet in length—supported continuously by reinforced concrete abutments and piers over concrete piles. Each skewed span was made up of four deep deck girders with steel angle lateral braces. The girders were welded steel, with 12-inch-wide flanges and 54-inch-deep webs that increased in depth over the center pier. The girders carried a 27-foot-wide concrete deck, which was bounded on both sides by concrete curbs with tubular aluminum alloy guardrails. As one of the first welded girder bridges built in Arizona, the structure was designed to specifications maintained by AHD, AASHTO (American Association of State Highway Officials), ASTM (American Society for Testing Materials) and ASW (American Society of Welding). In 1962 AHD designated the bridge construction as project S-326(3) and awarded the contract for the work to the Copper State Construction Company of Mesa. A Copper State crew soon thereafter began driving the H-pile substructure for the pier and abutments. The girders were fabricated in the shop, radiographed to check the welds, and moved to the site in eight 90-foot pieces. Once the girders were in place, the workers laid the concrete deck and installed the guardrails. In 1963 the bridge was completed. The Black Canyon Bridge consumed over 150,000 pounds of structural steel and over 450 cubic yards of concrete. Since its completion, it has carried mainline traffic on SR 260. More recently steel Thrie beams have been added onto the original tubular guardrails.

## SIGNIFICANCE STATEMENT

In the 1950s and 1960s, as fabrication and welding techniques improved, engineers around the country began experimenting with welded girders in lieu of riveted built-up beams. These typically featured I-shaped girders that increased in web depth over the bearing points. The welding on these earliest structures later proved through ultrasonic testing to be prone to fatigue and stress cracking at the weld lines, however, and the use of this type of girder was discontinued in favor of bolted connections and splices. In Arizona, relatively few welded girder bridges were ever built before the structural configuration fell from favor. The Mountain View Interchange [1053] on I 10 in Pima County, the Agua Fria River Bridge [0382] on I 17 at Black Canyon City and these two structures in Yavapai County are the only such welded girders identified from the historic period by the statewide inventory. The Black Canyon Bridge is distinguished as a relatively well-preserved example of this technologically important structural type.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

☐ associated with significant persons  
☐ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

☐ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

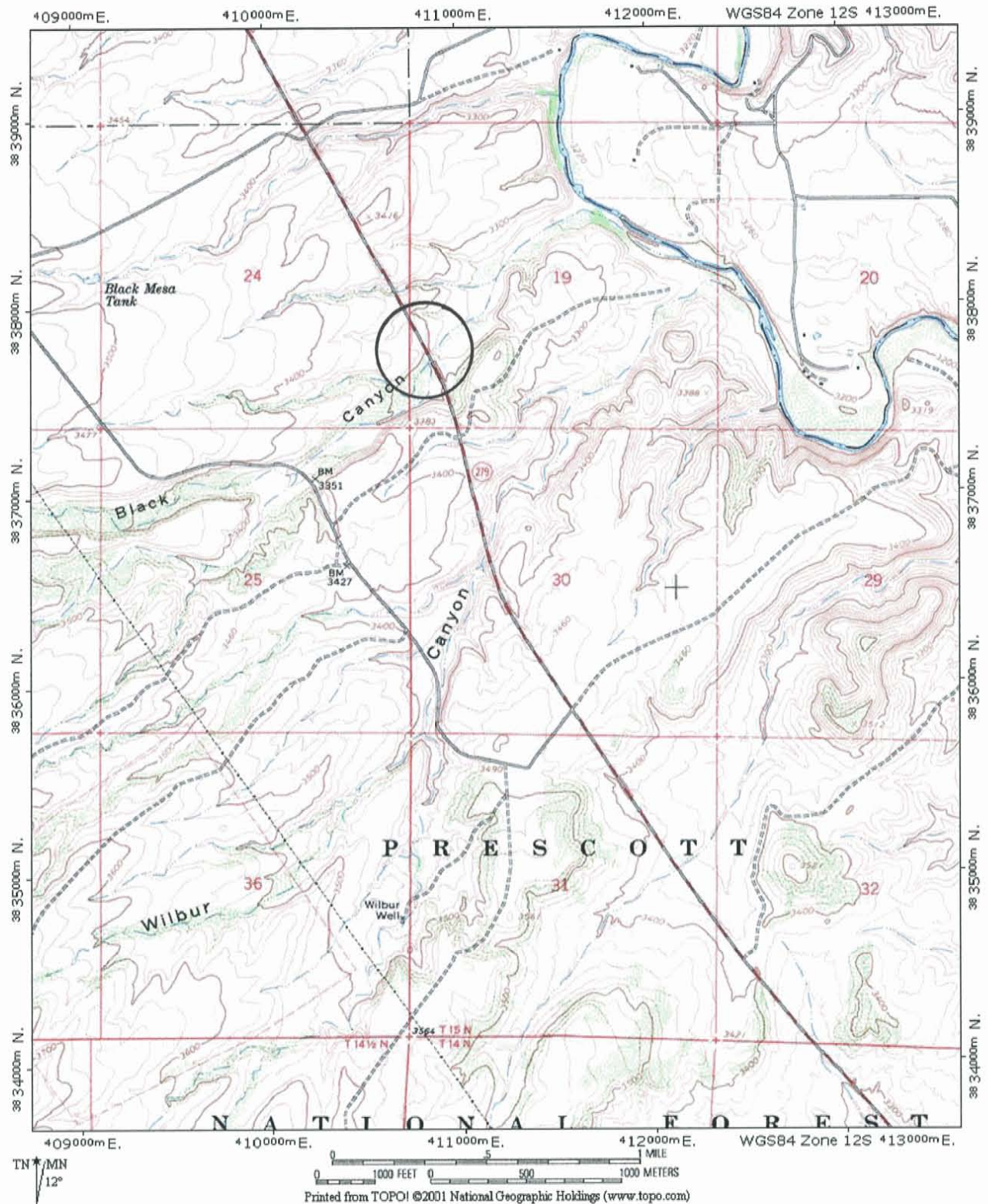
individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
 PERIOD OF SIGNIFICANCE: 1963-1964  
 THEME(S): Transportation: Highways



# BLACK CANYON BRIDGE

Structure No. 0758



Location Map

# HISTORIC BRIDGE INVENTORY

## Wilbur Canyon Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	00781
milepost	210.55	inventory route	SR 260
location	8.1 mi N Jct I 17	feature intersected	Wilbur Canyon
city/vicinity	Bridgeport	USGS quadrangle	Cornville
district	88	UTM reference	12.411142.3836692

### STRUCTURAL INFORMATION

main span number	3	main span type	403
appr. span number	0	appr. span type	
degree of skew	45	guardrail type	8
main span length	103.0	superstructure	welded steel deck girder
structure length	274.0	substructure	concrete abutments, wingwalls and piers
roadway width	30.0	floor/decking	concrete deck
structure width	35.5	other features	variable depth girders; solid concrete guardrails with aluminum tubes and steel Thrie beams

### HISTORICAL INFORMATION

construction date	1963	designer/engineer	Arizona Highway Department
project number	S-326(3)	builder/contractor	Copper State Construction Company, Mesa AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	1980	alterations	Thrie beams added to original guardrails

### NATIONAL REGISTER EVALUATION

inventory score	49	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A _____ B _____ C <u>x</u>
		signif. statement	well-preserved example of welded steel construction

### FORM COMPLETED BY

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420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004



# WILBUR CANYON BRIDGE

Structure No. 0781



## PHOTO INFORMATION

date of photo: November 2002

view direction: north east

photo no.: 02.11.262 02.11.264

## CONSTRUCTION HISTORY

Late in 1960 the Arizona Highway Department began planning for substantial new bridges over Wilbur Canyon and Black Canyon [0758], north of Camp Verde. The road between Camp Verde and Cottonwood had been in use for decades, and the existing structures at these crossings had deteriorated to the point of replacement. As delineated by AHD engineers, the replacement structure at Wilbur Canyon would be comprised of three long steel girder spans—up to 103 feet in length—supported continuously by reinforced concrete abutments and piers over concrete piles. Each skewed span was made up of four deep deck girders with steel angle lateral braces. The girders were welded steel, with 12-inch-wide flanges and 54-inch-deep webs that increased in depth over the center pier. The girders carried a 27-foot-wide concrete deck, which was bounded on both sides by concrete curbs with tubular aluminum alloy guardrails. As one of the first welded girder bridges built in Arizona, the structure was designed to specifications maintained by AHD, AASHTO (American Association of State Highway Officials), ASTM (American Society for Testing Materials) and ASW (American Society of Welding). In 1962 AHD designated the bridge construction as project S-326(3) and awarded the contract for the work to the Copper State Construction Company of Mesa. A Copper State crew soon thereafter began driving the H-pile substructure for the pier and abutments. The girders were fabricated in the shop, radiographed to check the welds, and moved to the site in twelve long pieces. Once the girders were in place, the workers laid the concrete deck and installed the guardrails. In 1963 the bridge was completed. Since its completion, it has carried mainline traffic on SR 260. More recently steel Thrie beams have been added onto the original tubular guardrails.

## SIGNIFICANCE STATEMENT

In the 1950s and 1960s, as fabrication and welding techniques improved, engineers around the country began experimenting with welded girders in lieu of riveted built-up beams. These typically featured I-shaped girders that increased in web depth over the bearing points. The welding on these earliest structures later proved through ultrasonic testing to be prone to fatigue and stress cracking at the weld lines, however, and the use of this type of girder was discontinued in favor of bolted connections and splices. In Arizona, relatively few welded girder bridges were ever built before the structural configuration fell from favor. The Mountain View Interchange [1053] on I 10 in Pima County, the Agua Fria River Bridge [0382] on I 17 at Black Canyon City and these two structures in Yavapai County are the only such welded girders identified from the historic period by the statewide inventory. The Wilbur Canyon Bridge is distinguished as a relatively well-preserved example of this technologically important structural type.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☐ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☐ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering

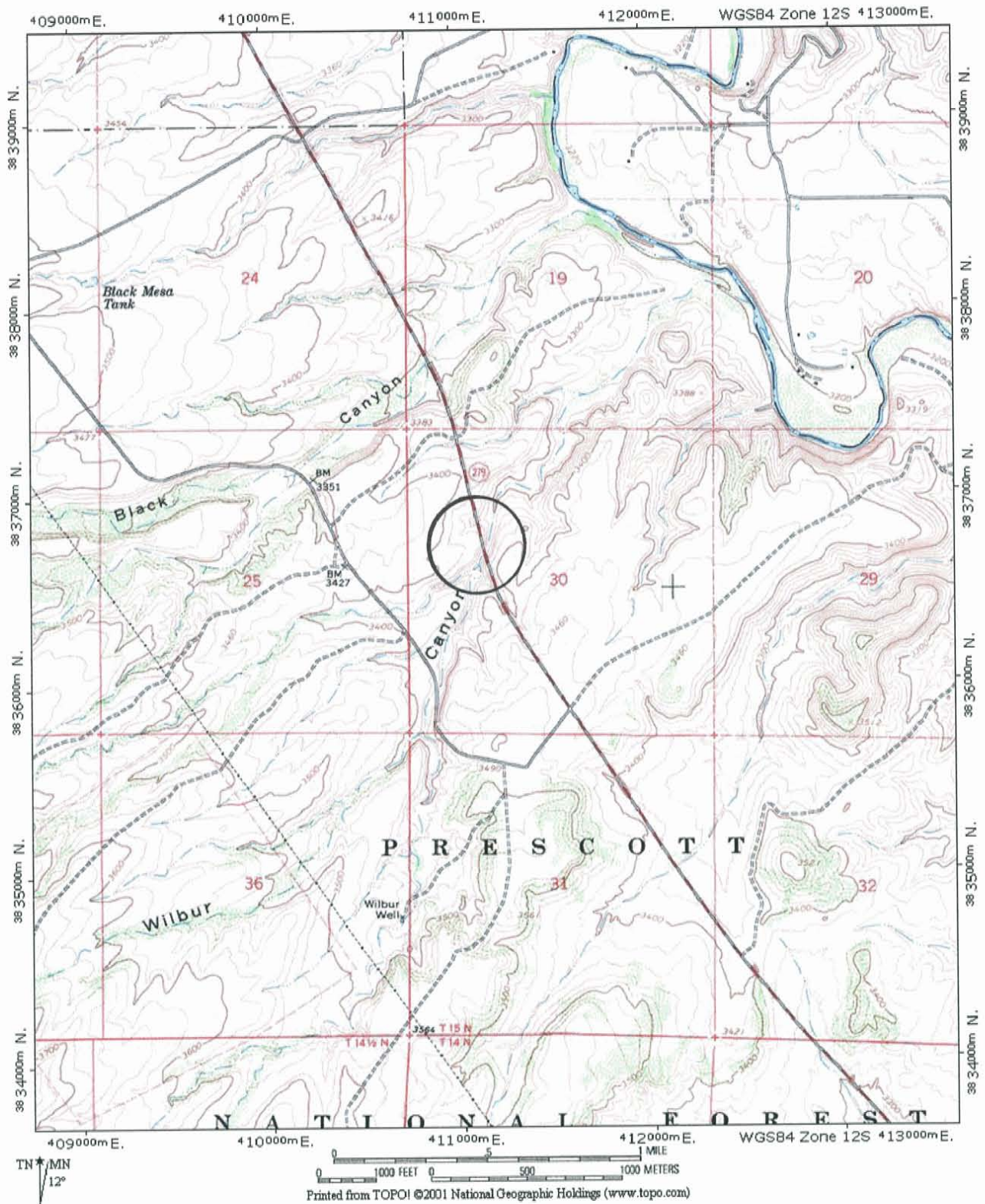
PERIOD OF SIGNIFICANCE: 1963-1964

THEME(S): Transportation: Highways



# WILBUR CANYON BRIDGE

Structure No. 0781



Location Map

# HISTORIC BRIDGE INVENTORY

## Granite Creek Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	01489
milepost	313.80	inventory route	SR 89
location	0.25 mi E of Jct. 89	feature intersected	Granite Creek
city/vicinity	Prescott	USGS quadrangle	Prescott
district	88	UTM reference	12.367546.3825500

### STRUCTURAL INFORMATION

main span number	3	main span type	104
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	0
main span length	48.0	superstructure	concrete deck girder
structure length	145.0	substructure	concrete abutments, wingwalls and piers
roadway width	20.6	floor/decking	concrete deck with asphalt overlay
structure width	22.9	other features	steel pipe guardrails with concrete bulkheads

### HISTORICAL INFORMATION

construction date	1921	designer/engineer	Arizona Highway Department
project number		builder/contractor	L.C. Lashmet, Prescott AZ
information source	ADOT bridge records	structure owner	Arizona Department of Transportation
alteration date(s)	ca1990	alterations	steel pipe guardrails partially replaced with Thrie beams

### NATIONAL REGISTER EVALUATION

inventory score	58	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/>
		signif. statement	relatively well-preserved example of early AHD concrete bridge design

### FORM COMPLETED BY

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Loveland, Colorado 80537  
31 October 2004



# GRANITE CREEK BRIDGE

Structure No. 1489



## PHOTO INFORMATION

photographer: Scott M. Kwiatkowski

view direction: west north

## CONSTRUCTION HISTORY

In 1920 the Arizona Highway Department undertook an improvement of the highway linking Prescott and Jerome. AHD designated this construction as Federal Aid Project 19, to be jointly funded by the state and the U.S. Bureau of Public Roads. Located from Jaeger Canyon to Granite Dells, the route under this project crossed Granite Creek northeast of Prescott, near the Ft. Whipple Barracks. Here State Engineer Merrill Butler designed a concrete bridge comprised of three 45-foot spans supported by concrete abutments and piers. The Granite Creek Bridge featured a 20-foot-wide concrete deck, bounded on the sides by AHD-standard steel pipe guardrails with paneled concrete bulkheads. In 1921 a contract to build the bridge was let to L.C. Lashmet of Prescott. The contractor worked on this bridge through the remainder of the year, completing the Granite Creek structure for a total cost of almost \$24,000. Since its completion, the Granite Creek Bridge has carried traffic on this regionally important state route, and has more recently been relegated to secondary bridge status. Thrie beams have been added to repair damage to the original guardrails, but the bridge remains otherwise unaltered.

## SIGNIFICANCE STATEMENT

The State of Arizona had begun using concrete for bridge superstructures as soon as it was formed. The earliest girder bridges, illustrated by the Antelope Hill Bridge [abd.] and the Santa Cruz River Bridge [8166], employed two deep girders that were cast integrally with the concrete deck. In 1919 the highway department developed a set of standard plans for concrete bridges that included slabs and girders. AHD engineers at that time dropped the two-girder design in favor of a new girder with three somewhat shallower beams. "The slab spans become uneconomical for spans greater than about 24'," Butler stated in 1920. "For greater spans, the three girder deck is the more economical up to about 50'." AHD's implementation of this configuration proved short-lived. According to Butler's successor W.C. Lefebvre in 1922, "A set of 4-girder reinforced concrete decks, ranging in span from 20 feet to 40 feet, have been worked up and are being used in the place of the old 3-girder standard plan which has become obsolete. These new spans, although designed for heavier loads than the old, are more economical in materials and have been used exclusively in the past two years where such spans were required." AHD engineers designed only ten three-girder bridges before shelving this standard, and fewer were actually constructed. Two bridges over Granite Creek [other: 0042] and the Cordes Bridge [8249] appear to be the only three-girder bridges in the state to have survived intact. As such the Granite Creek Bridge is an important, well-preserved example of early AHD design.

## NATIONAL REGISTER EVALUATION

### TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

### HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

### NATIONAL REGISTER CRITERIA

- ☒ Criterion A  
☐ Criterion B  
☒ Criterion C

### NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering

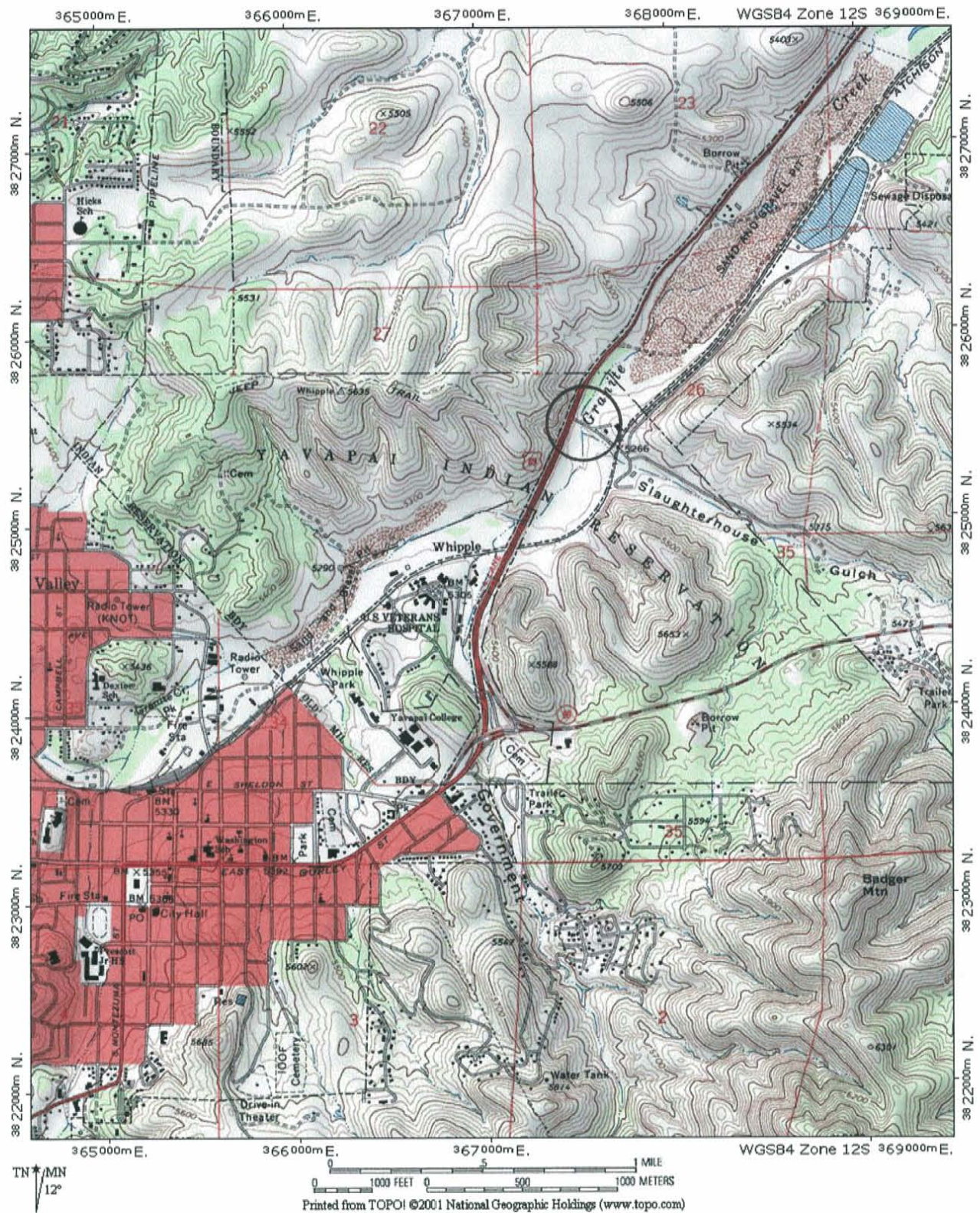
PERIOD OF SIGNIFICANCE: 1921-1964

THEME(S): Transportation: Highways



# GRANITE CREEK BRIDGE

Structure No. 1489



Location Map



# HISTORIC BRIDGE INVENTORY

## Little Hell Canyon Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	03381
milepost	0.00	inventory route	abd. US 89
location	0.1 mi West US 89	feature intersected	Little Hell Canyon
city/vicinity	Drake	USGS quadrangle	Meath Spring
district	88	UTM reference	12.371760.3882820

### STRUCTURAL INFORMATION

main span number	2	main span type	309
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	0
main span length	80.0	superstructure	steel rigid-connected Warren deck truss
structure length	174.0	substructure	concrete abutments, wingwalls and pier
roadway width	18.0	floor/decking	concrete deck over steel stringers
structure width	20.0	other features	upper chord: 2 channels w/ cover plate and lacing; lower chord: 2 angles w/ batten plates; vertical: 4 angles w/ contin. plate; diagonal: wide flange; lateral bracing: 1 angle; floor beam: I-beam; steel lattice guardrails

### HISTORICAL INFORMATION

construction date	1923	designer/engineer	Arizona Highway Department
project number	FAP 62	builder/contractor	Monarch Engineering Company, Denver CO
information source	ADOT bridge records	structure owner	USFS - Prescott National Forest
alteration date(s)		alterations	

### NATIONAL REGISTER EVALUATION

inventory score	82	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u>  </u> C <u>x</u>
		signif. statement	well-preserved example of uncommon structural type, located on regionally important route

### FORM COMPLETED BY

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31 October 2004



# LITTLE HELL CANYON BRIDGE

Structure No. 3381



## PHOTO INFORMATION

date of photo.: November 2002

view direction: south southwest

photo no.: 02.11.290 02.11.291



## CONSTRUCTION HISTORY

In the late 1910s Yavapai County surveyed a route between Prescott and Ash Fork as a county road. After completing its design, however, the county board of supervisors decided instead to turn the project over to the state and seek federal funding under the Federal Aid Highways Act. The Arizona Highway Department then resurveyed the route to meet federal specifications, divided the construction into four intermediate sections (Federal Aid Projects 36, 36-B, 61 and 62), and over the next three years undertook the extensive 50-mile highway construction. One of the final phases of the project involved construction of a bridge over Little Hell Canyon, a ruggedly walled watercourse north of Drake. For this crossing, the AHD bridge department engineered a medium-span deck truss supported by reinforced concrete abutments and pier with angled cutwaters. As delineated by AHD, the Little Hell Canyon Bridge was to consist of two 80-foot Warren deck trusses with riveted connections. The trusses featured built-up box beams for the upper chords and paired angles for the lower. They carried a concrete deck over steel stringers; this deck was bounded on the sides by steel lattice guardrails.

Early in 1923 the highway department awarded the construction contract under Federal Aid Project 62 to the Monarch Engineering Company for the Little Hell Canyon Bridge. The Denver-based contractor began excavation for the abutments on March 17 and completed grading the bridge's approaches on November 5. Total cost for the bridge: \$25,851. The Little Hell Canyon Bridge carried mainline traffic until its replacement with an new parallel structure in 1951. The 1923 structure now functions as a US Forest Service road beside U.S. Highway 89, in essentially unaltered condition.

## SIGNIFICANCE STATEMENT

US 89 was the latter-day iteration of the original north-south territorial route between Prescott and Phoenix. Built as part of a major construction program on the road, the Little Hell Canyon Bridge is historically significant for its integral association with this regionally important highway through central Arizona. Technologically, the bridge is noteworthy as an uncommon vehicular truss type. Nine deck trusses—five of which are Warrens—have been identified in the statewide inventory. All were erected between 1923 and 1934, all spanned between 77 and 116 feet, and all were designed and built either by the Arizona Highway Department or the US Bureau of Public Roads, using industry-standard detailing. The Little Hell Canyon Bridge is distinguished among these as one of the two earliest examples (other: the Allentown Bridge [3073] in Apache County). Standing essentially unaltered, the Little Hell Canyon Bridge is an important early Arizona vehicular span.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

☒ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering

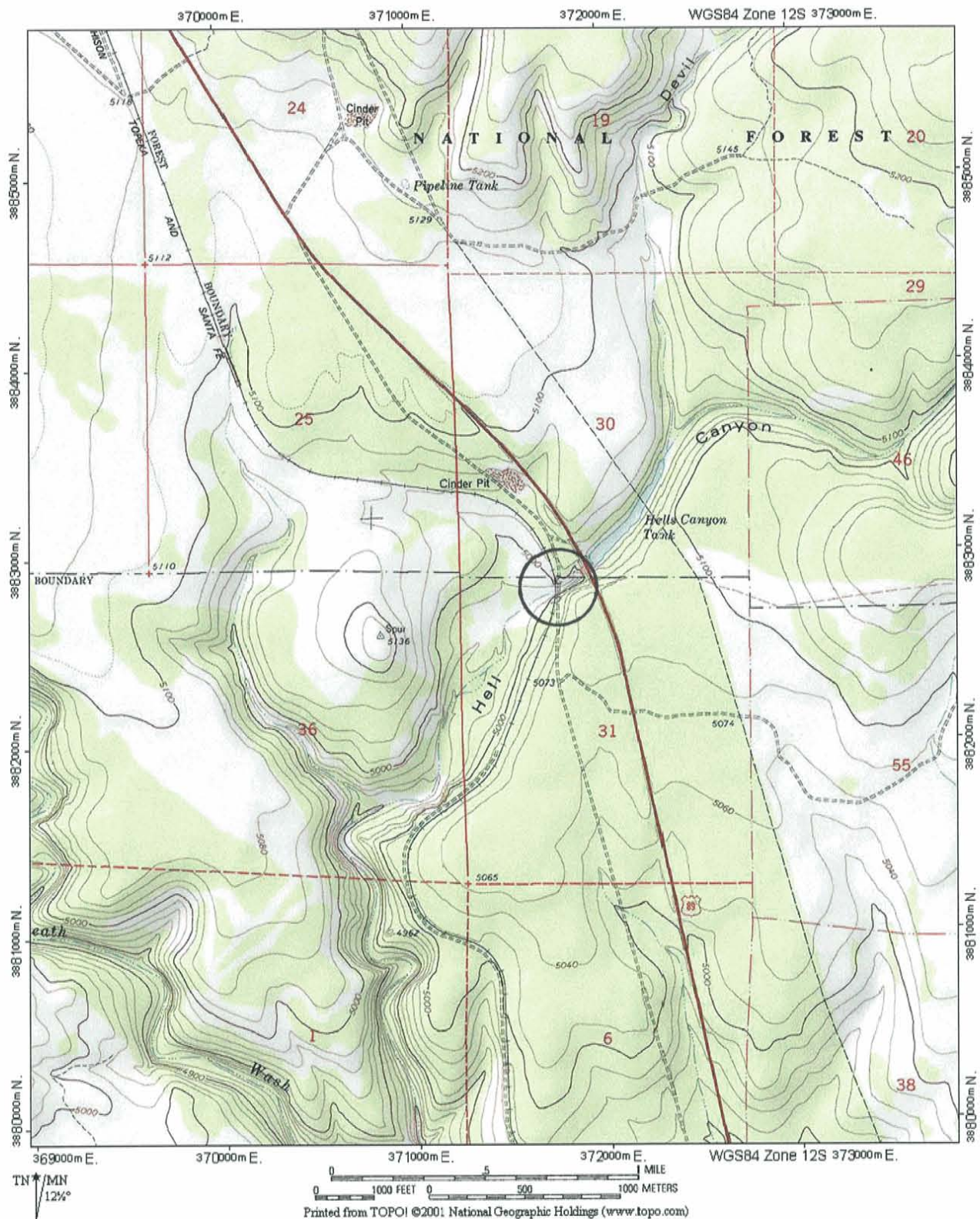
PERIOD OF SIGNIFICANCE: 1923-1964

THEME(S): Transportation: Highways



# LITTLE HELL CANYON BRIDGE

Structure No. 3381



Location Map

# HISTORIC BRIDGE INVENTORY

## Walnut Grove Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	08227
milepost	0.00	inventory route	Wagoner Road
location	9.8 mi SE Jct SR 89	feature intersected	Hassayampa River
city/vicinity	Walnut Grove	USGS quadrangle	Walnut Grove
district	88	UTM reference	12.355667.3797657

### STRUCTURAL INFORMATION

main span number	1	main span type	310
appr. span number	1	appr. span type	310
degree of skew	0	guardrail type	6
main span length	150.0	superstructure	steel rigid-connected Camelback through truss
structure length	196.0	substructure	concrete abutments, wingwalls and pier
roadway width	15.5	floor/decking	timber deck with asphalt overlay
structure width	16.5	other features	upper chord: 2 channels w/ cover plate and lacing; lower chord: 2 channels w/ batten plates; vertical: 2 channels w/ lacing; diagonal: 2 angles w/ batten plates; lateral bracing: 1 angle; floor beam: I-beam; steel lattice guardrails

### HISTORICAL INFORMATION

construction date	1924	designer/engineer	El Paso Bridge & Iron Company, El Paso TX
project number		builder/contractor	El Paso Bridge & Iron Company, El Paso TX
information source	county bridge records	structure owner	Yavapai County
alteration date(s)	ca1970	alterations	deck replaced

### NATIONAL REGISTER EVALUATION

inventory score	66	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A _____ B _____ C <u>x</u> _____
		signif. statement	well-preserved early example of county-level truss bridge construction

### FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign  
420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004



# WALNUT GROVE BRIDGE

Structure No. 8227



## PHOTO INFORMATION

date of photo.: November 2002

view direction: west south

photo no.: 02.11.310 02.11.312



## CONSTRUCTION HISTORY

In 1922 the Yavapai County Board of Supervisors received an urgent citizens' petition for a permanent wagon bridge over the Hassayampa River near the small town of Walnut Grove. Almost two years later, in April 1924, the supervisors finally agreed to build a steel truss bridge here. They ordered the county clerk to advertise in the bridge industry for competitive bids. Following typical procedure, the county engineer specified only the general dimensions and location of the bridge and required bridge companies to submit truss designs with their proposals. Four firms responded: the Monarch Engineering Company of Denver, the L.C. Lashmet Construction Company, the Pacific Coast Engineering Company and the El Paso Bridge & Iron Company of Texas. With a proposed erected cost of \$7,880, El Paso B&I was the low bidder and received the contract in May.

The contractors began excavating for the substructure soon thereafter, and, using steel components milled by the Carnegie Steel Company, erected this medium-span truss that fall. The bridge built by El Paso B&I was a two-span structure, with a Camelback through truss over the river's main channel and a short Pratt pony truss approach span. Both spans employed rigid connections, the typical built-up steel members and a timber deck on steel stringers. The trusses were supported by concrete abutments and a single solid pier with angled cutwaters. Yavapai County accepted the completed bridge in December. Since that time, the Walnut Grove Bridge has functioned in place at this remote crossing of the Hassayampa River, with only minor maintenance.

## SIGNIFICANCE STATEMENT

The Arizona Highway Department was expanding its administrative role on the state road system in the 1920s, but construction of bridges over secondary crossings still fell largely under the purview of the individual counties. The Walnut Grove Bridge is a representative example of a county-built truss—designed, fabricated and erected by a regionally active bridge company under contract with a county engineer. The structure is distinguished technologically as the earlier of two Camelback vehicular trusses found in Arizona (other: the Gillespie Dam Bridge [8021] in Maricopa County). It is also the only wagon bridge in the state that combines through and pony truss spans. In essentially unaltered condition at this remote Yavapai County crossing, the Walnut Grove Bridge is a significant remnant of early Arizona bridge construction.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☐ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☐ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

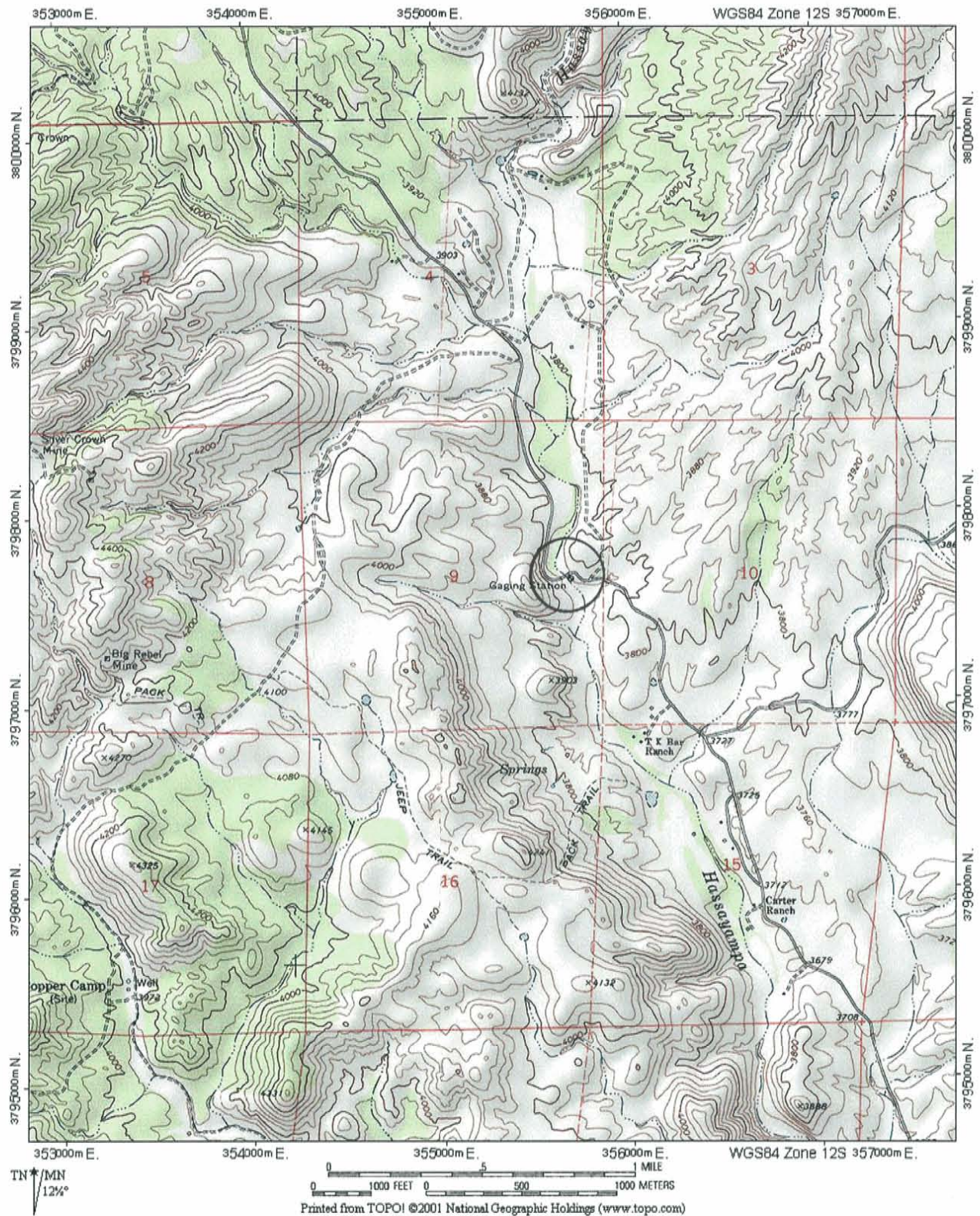
- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
 PERIOD OF SIGNIFICANCE: 1924-1964  
 THEME(S): Transportation: Highways



# WALNUT GROVE BRIDGE

Structure No. 8227



Location Map



# HISTORIC BRIDGE INVENTORY

## Verde River Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	08236
milepost	0.00	inventory route	Old US 89
location	1.25 mi S Jct SR 89	feature intersected	Verde River
city/vicinity	Paulden	USGS quadrangle	Chino Valley North
district	88	UTM reference	12.366530.3858923

### STRUCTURAL INFORMATION

main span number	1	main span type	111
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	4
main span length	100.0	superstructure	concrete filled spandrel arch
structure length	127.0	substructure	concrete abutments and wingwalls
roadway width	20.1	floor/decking	asphalt roadway over earth fill
structure width	23.1	other features	moulded concrete guardrails with corbelled concrete bulkheads and square concrete balusters; concrete corbels at arch ring

### HISTORICAL INFORMATION

construction date	1923	designer/engineer	Arizona Highway Department
project number	FAP 61	builder/contractor	L.C. Lashmet Company, Prescott AZ
information source	ADOT bridge records	structure owner	Yavapai County
alteration date(s)		alterations	

### NATIONAL REGISTER EVALUATION

inventory score	64	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u>  </u> C <u>x</u>
		signif. statement	well-preserved, relatively early standard structural type, located on important highway

### FORM COMPLETED BY

Clayton B. Fraser, Principal

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420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004



# VERDE RIVER BRIDGE

Structure No. 8236



## PHOTO INFORMATION

date of photo.: November 2002

view direction: north west

photo no.: 02.11.178 02.11.179

## CONSTRUCTION HISTORY

In the late 1910s Yavapai County surveyed a route between Prescott and Ash Fork as a county road. After completing its design, however, the county board of supervisors instead decided to turn the project over to the state and seek federal funding. The Arizona Highway Department then resurveyed the route to meet federal specifications as a state highway. AHD divided the work into four sections—Federal Aid Projects 36, 36-B, 61 and 62—and over the next three years undertook work on the extensive 50-mile route. One phase of the project involved construction of a substantial bridge over the Verde River at a rugged, steep-walled canyon south of Paulden. For this structure, the AHD bridge department engineered a long-span concrete arch using its standard, non-Luten design. The structure featured a single 100-foot elliptical arch, with concrete spread footings, earth roadway and moulded concrete guardrails with corbeled bulkheads and square concrete balusters.

In September 1922 the highway department awarded a construction contract for the Verde River bridge to L.C. Lashmet. The Prescott contractor began excavating for the substructure on October 16 and worked through the winter, completing the approach grading on March 2, 1923. Total cost of the bridge: \$18,380. The Verde River Bridge carried traffic as part of U.S. Highway 89 until the route was realigned over a new bridge in 1967. At that time the 1923 structure was transferred to Yavapai County and now carries local traffic in unaltered condition.

## SIGNIFICANCE STATEMENT

US 89 was the latter-day iteration of the original north-south territorial route between Prescott and Phoenix. Built as part of a major construction program on the road, the Verde River Bridge is historically significant for its integral association with this regionally important highway through central Arizona. Additionally, the bridge is technologically important as an early example of a statewide bridge trend. The Arizona Highway Department used three basic arch configurations in the 1910s and 1920s—the Luten arch, the open spandrel arch, and what it termed the “common arch”, or segmental filled spandrel design. Long-span examples of the former were engineered by their inventor Daniel Luten and his assistants. The latter two structural types were designed in-house by AHD engineers for medium- and long-span applications. The Verde River Bridge is noteworthy as the longest of the four such arches identified in the inventory (others: Devils Canyon Bridge [abd.], Lynx Creek Bridge [8256] and Fossil Creek Bridge [3215]). All featured similar Luten-type steel reinforcing, span lengths and concrete detailing.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☒ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

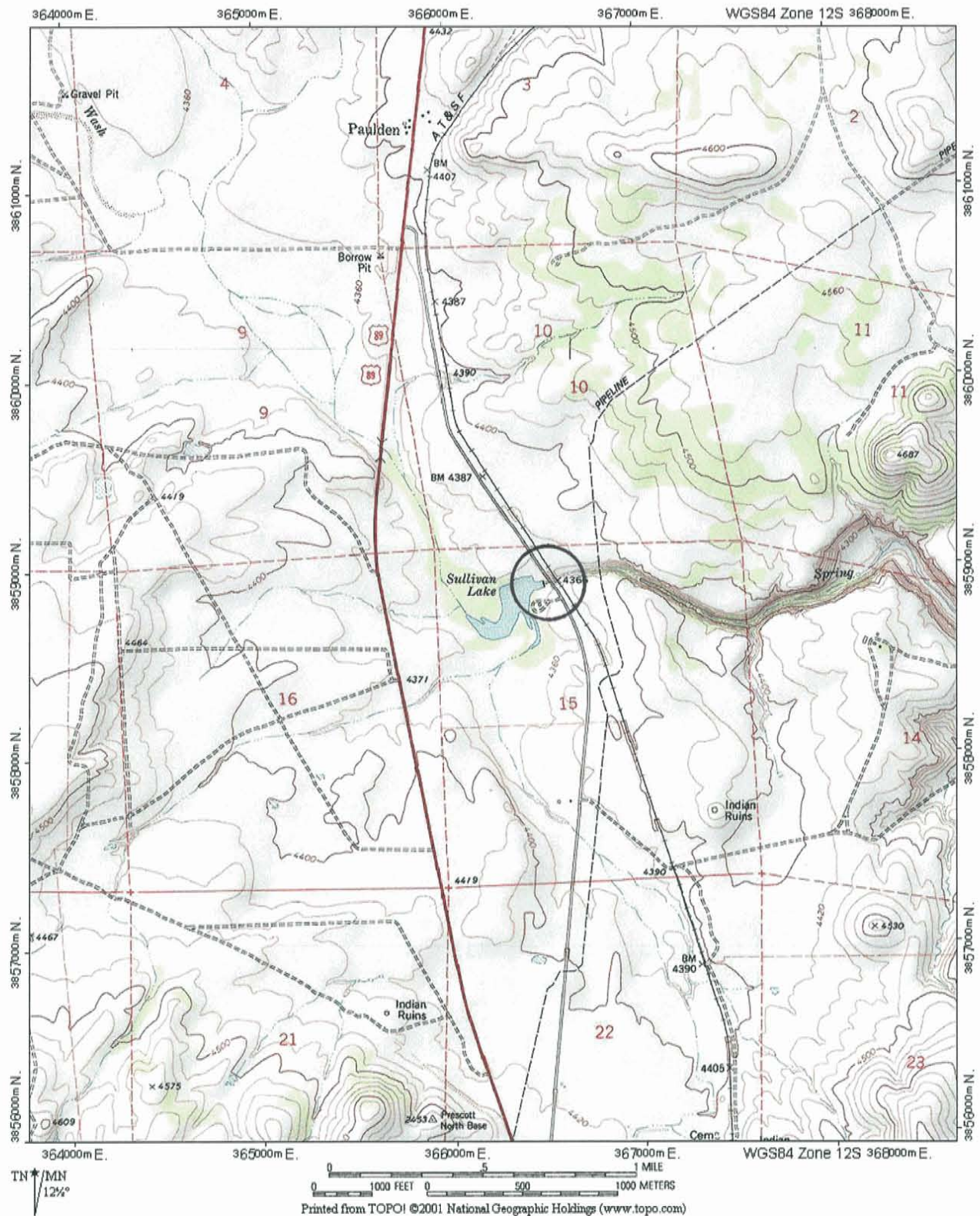
- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
 PERIOD OF SIGNIFICANCE: 1923-1964  
 THEME(S): Transportation: Highways



# VERDE RIVER BRIDGE

Structure No. 8236



Location Map

# HISTORIC BRIDGE INVENTORY

## Cordes Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	08249
milepost	0.00	inventory route	Antelope Creek Road
location	3.0 mi West of I 17	feature intersected	Antelope Creek
city/vicinity	Cordes	USGS quadrangle	Clector
district	88	UTM reference	12.392657.3796360

### STRUCTURAL INFORMATION

main span number	1	main span type	104
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	40.0	superstructure	concrete three-beam deck girder
structure length	42.0	substructure	concrete abutments and wingwalls
roadway width	20.1	floor/decking	concrete deck
structure width	22.6	other features	steel pipe guardrails

### HISTORICAL INFORMATION

construction date	1922	designer/engineer	Arizona Highway Department
project number		builder/contractor	
information source	ADOT bridge records	structure owner	Yavapai County
alteration date(s)		alterations	

### NATIONAL REGISTER EVALUATION

inventory score	61	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A _____ B _____ C <u>x</u>
		signif. statement	well-preserved example of early AHD bridge design

### FORM COMPLETED BY

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Loveland, Colorado 80537  
31 October 2004



## CORDES BRIDGE

Structure No. 8249



### PHOTO INFORMATION

date of photo: November 2002

view direction: south east

photo no: 02.11.304 02.11.305



## CONSTRUCTION HISTORY

This small-scale concrete bridge carries a gravel-surfaced county road over Antelope Creek in the small Yavapai County community of Cordes. Now called the Antelope Creek Road, this route used to be State Highway 69, the secondary route between Phoenix and Prescott. The bridge's single-span superstructure is configured with three concrete girders, which are poured integrally with the concrete deck. The girders are simply supported by concrete abutments; the 22-foot-wide deck is bounded on both sides by steel pipe guardrails. The Cordes Bridge was designed by Arizona Highway Department bridge engineer Merrill Butler and erected in 1921-1922. Its plank formwork is crude, the design simple and unarticulated—indicative of early construction by an unskilled work crew. Since its completion, the bridge has carried vehicular traffic, though SH 69 has been realigned to the east. Other than the installation of several utility cables to one of its spandrels, it remains unaltered.

## SIGNIFICANCE STATEMENT

The State of Arizona had begun using concrete for bridge superstructures as soon as it was formed in 1912. The earliest girder bridges, illustrated by the Antelope Hill Bridge [abd.] and the Santa Cruz River Bridge [8166], employed two deep girders per span, which were cast integrally with the concrete deck. In July 1919 the highway department developed a set of standard plans for concrete bridges that included slabs and girders. AHD engineers at that time dropped the two-girder design in favor of a new girder with three somewhat shallower beams. "The slab spans become uneconomical for spans greater than about 24'," State Bridge Engineer Merrill Butler stated in 1920. "For greater spans, the three girder deck is the more economical up to about 50'."

AHD's implementation of this configuration proved short-lived. According to Butler's successor W.C. LeFebvre in 1922, "A set of 4-girder reinforced concrete decks, ranging in span from 20 feet to 40 feet, have been worked up and are being used in the place of the old 3-girder standard plan which has become obsolete. These new spans, although designed for heavier loads than the old, are more economical in materials and have been used exclusively in the past two years where such spans were required." AHD engineers designed only ten three-girder bridges before shelving this standard; fewer were actually constructed. The Cordes Bridge and the Granite Creek Bridge [0042], both in Yavapai County, appear to be the only three-girder bridges in the state to have survived intact. As such the Cordes Bridge is an important, well-preserved example of early AHD design development.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☐ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☐ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Engineering

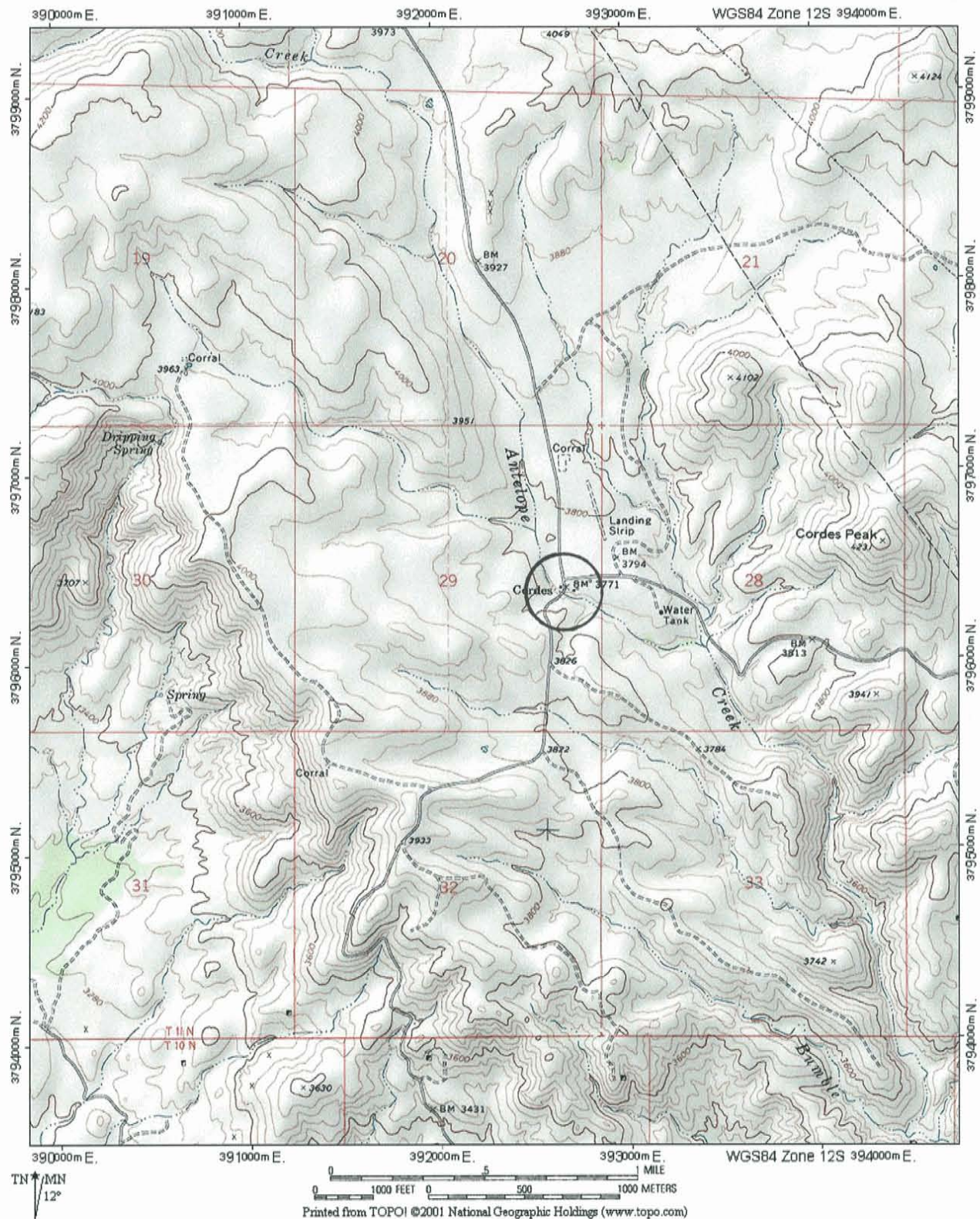
PERIOD OF SIGNIFICANCE: 1922-1964

THEME(S): Transportation: Highways



# CORDES BRIDGE

Structure No. 8249



Location Map

# HISTORIC BRIDGE INVENTORY

## Lynx Creek Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	08256
milepost	0.00	inventory route	Old Black Canyon Highway
location	0.9 mi NE Jct SR 69	feature intersected	Lynx Creek
city/vicinity	Prescott	USGS quadrangle	Prescott Valley South
district	88	UTM reference	12.373987.3824243

### STRUCTURAL INFORMATION

main span number	1	main span type	111
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	6
main span length	90.0	superstructure	concrete filled spandrel arch
structure length	120.0	substructure	concrete abutments and wingwalls
roadway width	16.2	floor/decking	asphalt roadway over earth fill
structure width	18.7	other features	steel pipe guardrails with paneled concrete bulkheads

### HISTORICAL INFORMATION

construction date	1922	designer/engineer	Arizona Highway Department
project number		builder/contractor	Windsor, Coleman & King
information source	ADOT bridge records	structure owner	Yavapai County
alteration date(s)	2000	alterations	replacement bridge built

### NATIONAL REGISTER EVALUATION

inventory score	57	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A _____ B _____ C <u>x</u>
		signif. statement	well-preserved early example of AHD bridge design

### FORM COMPLETED BY

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420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004





## PHOTO INFORMATION

date of photo: November 2002

view direction: north west

photo no.: 02.11.259 02.11.257



## CONSTRUCTION HISTORY

The early stage and freighting road that connected Fort Whipple at Prescott with other military installations in Arizona followed the Black Canyon, a steep-sided chasm in the center of Yavapai County. In the early 1920s a county faction was agitating for a state highway designation for the Black Canyon Highway. To improve the chances, the county board of supervisors in 1921 decided to replace the existing ford on Lynx Creek, 1½ miles east of Prescott, with a substantial bridge. For the first highway crossing of the creek, Arizona Highway Department bridge engineer Merrill Butler designed this filled spandrel concrete arch. The Lynx Creek Bridge extended 90 feet between the abutments and had a 16-foot-wide roadway. This roadway was flanked on both sides by AHD-standard guardrails, featuring steel pipe guardrails with paneled concrete bulkheads and posts. Yavapai County contracted for approximately \$15,000 with Navajo County builders Windsor, Coleman & King, the same firm that had an AHD contract to build the Granite Creek Bridge [0042]. With "considerable architectural beauty," according to the *Prescott Courier*, the Lynx Creek Bridge was opened to traffic with great ceremony in October 1922. The Black Canyon Highway was never made a state route. The Lynx Creek Bridge carried vehicular traffic on this secondary route until a parallel structure was built immediately adjacent to the original arch in 2000. The bridge is now open for pedestrian use.

## SIGNIFICANCE STATEMENT

As an alternative to hiring bridge companies or independent engineers, the bridge section of the Arizona Highway Department in the 1920s offered to design non-federal aid county bridges in the state. AHD thus functioned as consulting engineer for these county projects. The counties, however, seldom used this service. The Lynx Creek Bridge is distinguished as the only known major structure built under this arrangement. Additionally, the bridge is representative of another early trend. AHD used three basic concrete arch configurations in the 1910s and 1920s: the Luten arch, the open spandrel arch, and what it termed the "common arch", or segmental filled spandrel design. Long-span examples of the former, as illustrated by the Canyon Padre Bridge, the Verde River Bridge [8152] and the Holbrook Bridge, were engineered by their inventor Daniel Luten or his assistants. The latter two were designed in-house by AHD bridge engineers for medium- and long-span applications. The Lynx Creek Bridge is one of only four such AHD common arches identified in the inventory (others: Devils Canyon Bridge, Fossil Creek Bridge [3215], and the Verde River Bridge [8236]). All feature similar span lengths, arch rises and detailing. The Lynx Creek Bridge is a well-preserved example of this bridge construction trend.

## NATIONAL REGISTER EVALUATION

### TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

### HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☐ associated with significant events or patterns  
☐ contributes to historical district

### NATIONAL REGISTER CRITERIA

- ☐ Criterion A  
☐ Criterion B  
☒ Criterion C

### NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Engineering

PERIOD OF SIGNIFICANCE: 1922-1964

THEME(S): Transportation: Highways







# HISTORIC BRIDGE INVENTORY

## Broadway Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	08488
milepost	0.00	inventory route	Broadway Street
location	1.0 mi N SR 89A	feature intersected	Bitter Creek
city/vicinity	Clarkdale	USGS quadrangle	Clarkdale
district	88	UTM reference	12.403370.3848507

### STRUCTURAL INFORMATION

main span number	5	main span type	201
appr. span number	0	appr. span type	
degree of skew	30	guardrail type	4
main span length	27.0	superstructure	concrete slab
structure length	130.0	substructure	concrete abutments, wingwalls and piers
roadway width	18.0	floor/decking	concrete deck with asphalt overlay
structure width	21.3	other features	skewed superstructure; moulded concrete guardrails with paneled concrete parapet walls; concrete lamp post pedestals

### HISTORICAL INFORMATION

construction date	1917	designer/engineer	United Verde Copper Company
project number		builder/contractor	Fleming & Stitzer
information source	city bridge records	structure owner	City of Clarkdale
alteration date(s)		alterations	

### NATIONAL REGISTER EVALUATION

inventory score	51	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u>  </u> C <u>x</u>
		signif. statement	outstanding early example of common structural type

### FORM COMPLETED BY

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420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004



## BROADWAY BRIDGE

Structure No. 8488



### PHOTO INFORMATION

date of photo: November 2002

view direction: northwest southwest

photo no.: 02.11.78 02.11.79

## CONSTRUCTION HISTORY

In 1884 Montana copper magnate William A. Clark purchased the United Verde Mines in Yavapai County. After serving a term in the U.S. Senate (Montana; 1902-1908), he later purchased land from the Jordan Ranch near Jerome and in 1910 began construction of a smelter to process the ore from his mines. As construction on the immense smelter complex was nearing completion in 1914, Clark laid out a company town, immodestly naming it Clarkdale and grandly designated the road to his smelter as Broadway. The engineering department of the United Verde Copper Company in 1917 designed this concrete slab structure to carry Broadway over Bitter Creek.

The structure was comprised of five 27-foot spans, supported by tapered concrete piers with angled cutwaters. The bridge featured handsomely articulated concrete detailing, with decoratively formed parapet walls and bulkheads that supported light standards at the four corners. With the drawings complete, the company hired contractors Fleming & Stitzer to construct the bridge. They apparently completed it in 1917. Three years later Yavapai County purchased the Broadway Bridge from Clark. Although Clarkdale later folded with the mines, the Broadway Bridge remained in place. The town now serves as a retirement community and the bridge still carries local traffic over Bitter Creek. The concrete work is all intact, but the light standards have been removed.

## SIGNIFICANCE STATEMENT

The most common vehicular bridge type in Arizona, the simple reinforced concrete slab is represented by over 110 structures in the historic bridge inventory. The Broadway Bridge in Clarkdale displays unadventurous span and total lengths, but is nevertheless technologically significant as one of the earliest intact examples in Arizona of this fundamental bridge design. It is further distinguished by the architectural treatment of its approaches—a rare commodity among the state's starkly engineered concrete spans. The bridge is historically significant for its association with the Verde Copper Company, an important early Arizona industry. One of the few privately constructed roadway spans in Arizona, the Broadway Bridge is an important early transportation resource.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

☒ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

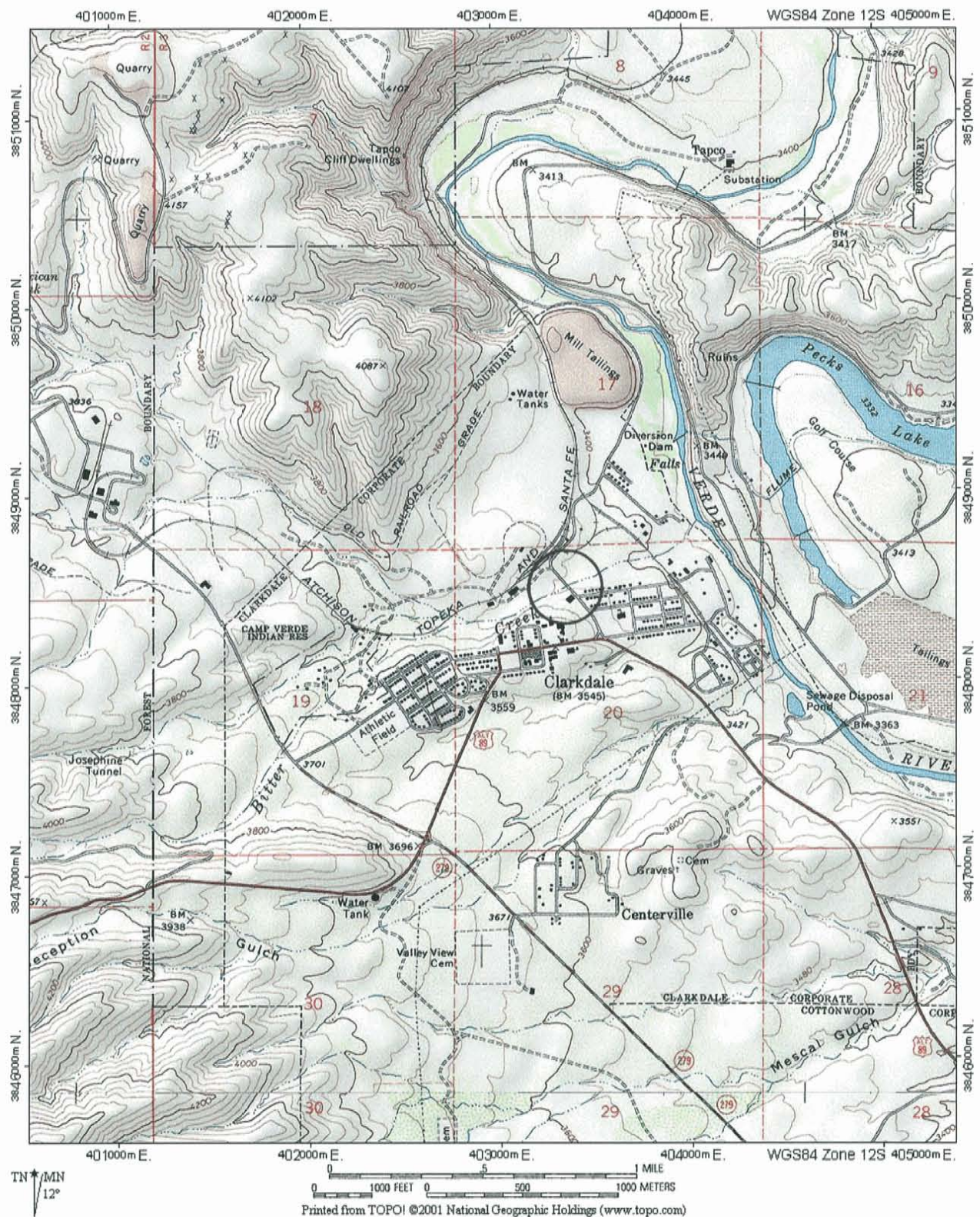
individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
 PERIOD OF SIGNIFICANCE: 1917-1964  
 THEME(S): Transportation: Highways



# BROADWAY BRIDGE

Structure No. 8488



Location Map



# HISTORIC BRIDGE INVENTORY

## Willis Street Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	08550
milepost	0.00	inventory route	Willis Street
location	0.1 mi West of SR 89	feature intersected	Granite Creek
city/vicinity	Prescott	USGS quadrangle	Prescott
district	88	UTM reference	12.364920.3823430

### STRUCTURAL INFORMATION

main span number	2	main span type	104
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	4
main span length	33.0	superstructure	concrete deck girder
structure length	65.0	substructure	stone masonry abutments, wingwalls and pier
roadway width	28.0	floor/decking	concrete deck with asphalt overlay
structure width	40.5	other features	steel pipe guardrails with stone masonry columns

### HISTORICAL INFORMATION

construction date	1936	designer/engineer	Arizona Highway Department
project number		builder/contractor	Works Progress Administration
information source	city bridge records	structure owner	City of Prescott
alteration date(s)		alterations	

### NATIONAL REGISTER EVALUATION

inventory score	45	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	eligible
		NRHP criteria	A _____ B _____ C <u>x</u> _____
		signif. statement	well-preserved, early example of Depression-era bridge construction

### FORM COMPLETED BY

Clayton B. Fraser, Principal

FRASERdesign  
420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004



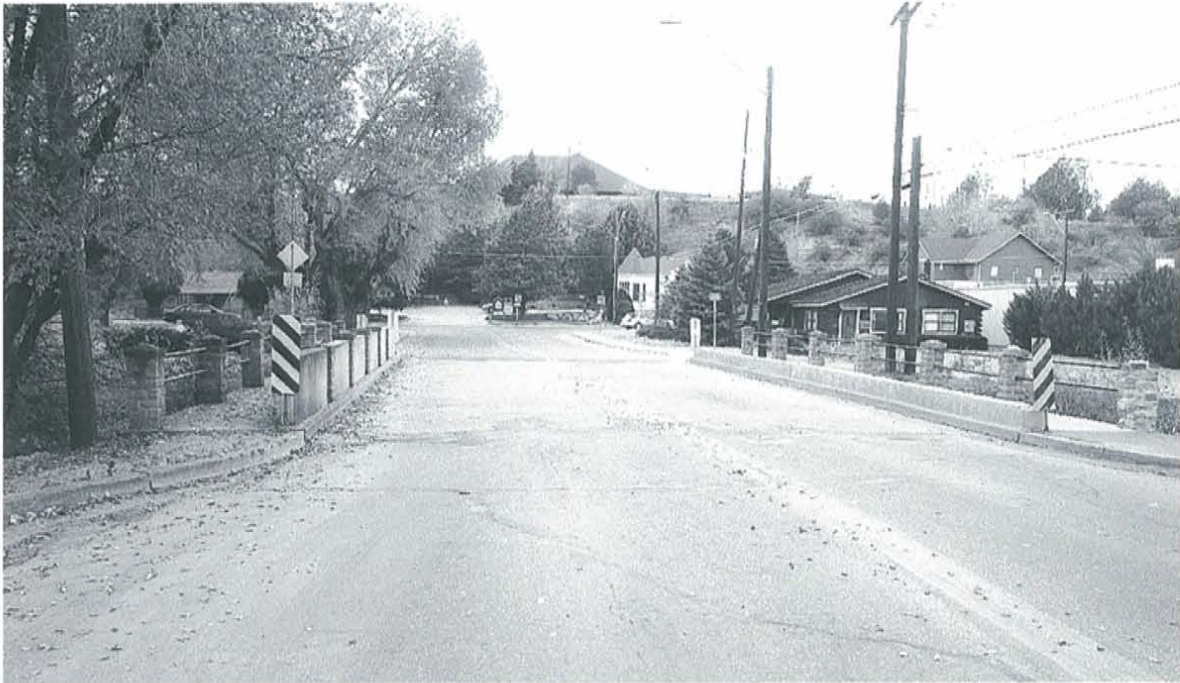


PHOTO INFORMATION

date of photo: November 2002

view direction: east northeast

photo no.: 02.11.110 02.11.112

## CONSTRUCTION HISTORY

This small-scale bridge carries Willis Street over Granite Creek in the downtown area of Prescott. The structure is configured with two reinforced concrete deck girder spans supported by stone masonry abutments and pier. The spans reach 33 feet in length; the roadway is 28 feet wide. This roadway is flanked on both sides by concrete sidewalks cantilevered from the outer edges of the girders. The sidewalks are bounded by steel pipe handrails with stone masonry posts. The Willis Street Bridge was built from a standard design produced by the Arizona Highway Department. As indicated by etchings in the concrete, it was erected by the Works Progress Administration in 1936. Since its completion, the bridge has carried city street traffic, in unaltered condition.

## SIGNIFICANCE STATEMENT

During the 1930s the Great Depression devastated the nation's economy, leaving millions of Americans jobless and homeless. By 1933 more than 13 million workers were unemployed, more than 1,000 homes were being foreclosed upon each day, and cities and counties across the country were bankrupt. In an effort to alleviate the financial distress, President Roosevelt established an array of federal agencies whose primary purpose was to funnel billions of dollars of relief money to the destitute citizenry. A favored way of distributing funds to the unemployed was by so-called make-work projects—maintaining national forests and parks, documenting historic sites, constructing buildings, dams, roads, bridges, etc. Arizona received several million dollars of relief money from the federal government, much of it earmarked for road and bridge construction.

To administer all of this activity, the Roosevelt administration established such bureaus as the Civilian Conservation Corps and the Work Projects Administration (later renamed the Works Progress Administration). This latter agency was responsible for the construction of public buildings around the country as well as countless miles of roads and thousands of bridges. "WPA is doing its share to cut down the tragic death toll of sudden death on America's highway," *The WPA Worker* reported in July 1936. "Under the Emergency Program, workers from relief rolls have replaced thousands of narrow and dangerous bridges. They have built 11,000 new bridges in addition to repairing 17,000 others." In Arizona some 15 bridges have been identified as being built by the WPA. Of these the Willis Street Bridge is distinguished for its well-preserved condition and the level of craftsmanship in its construction.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☐ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☐ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Engineering

PERIOD OF SIGNIFICANCE: 1936-1964

THEME(S): Transportation: Highways



## Structure No. 8550





# HISTORIC BRIDGE INVENTORY

## Walnut Creek Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	08741
milepost	0.00	inventory route	Williamson Valley Road
location	38 mi N of Iron Spring Rd	feature intersected	Walnut Creek
city/vicinity	Paulden	USGS quadrangle	Indian Peak
district	87	UTM reference	12.334170.3866640

### STRUCTURAL INFORMATION

main span number	1	main span type	310
appr. span number	1	appr. span type	101
degree of skew	0	guardrail type	6
main span length	138.0	superstructure	steel rigid-connected Pratt through truss
structure length	169.0	substructure	concrete abutments and wingwalls
roadway width	13.9	floor/decking	timber deck over timber stringers
structure width	16.1	other features	upper chord: 2 channels w/ cover plate and lacing; lower chord: 4 angles w/ batten plates; vertical: 2 channels w/ lacing; diagonal: 2 - 4 angles w/ lacing; lateral bracing: 1 angle; floor beam: I-beam; Thrie beam guardrails

### HISTORICAL INFORMATION

construction date	1913	designer/engineer	US Office of Indian Affairs
project number		builder/contractor	Midland Bridge Company, Kansas City MO
information source	ADOT bridge records	structure owner	Yavapai County
alteration date(s)	1936	alterations	truss superstructure moved to this location

### NATIONAL REGISTER EVALUATION

inventory score	69	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/>
		signif. statement	outstanding example of early truss construction

### FORM COMPLETED BY

Clayton B. Fraser, Principal

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Loveland, Colorado 80537  
31 October 2004



# WALNUT CREEK BRIDGE

Structure No. 8741



## PHOTO INFORMATION

date of photo: November 2002

view direction: north east

photo no.: 02.11.239 02.11.240

## CONSTRUCTION HISTORY

In 1912 Arizona Congressman Carl Hayden passed legislation authorizing the Secretary of the Interior to investigate the necessity for a "suitable steel and concrete wagon bridge" across the Gila River on the San Carlos Indian Reservation. Responsibility for locating and designing the Gila River Bridge fell upon the Indian Office in Washington, D.C. Rather than place the bridge on the Reservation, OIA engineers located it more than 20 miles upriver near Calva. As delineated by OIA in July 1913, the bridge was comprised of seven Pratt through truss spans, each extending 138 feet, for an overall length of almost 1,000 feet. To fabricate and erect the trusses, OIA contracted with the Midland Bridge Company of Kansas City. During the fall of 1913 Midland shipped several carloads of steel to the site by rail and began truss erection. The San Carlos Bridge was reported complete by the end of the year.

The bridge carried vehicular traffic until the south approach was washed away in a 1915 flood, rendering it impassible. The OIA waited until February 1921 to reopen the bridge by erecting four new through trusses. In 1935 the agency decided to replace the bridge entirely. In January 1936 Arizona Highway Department Bridge Engineer Ralph Hoffman designed new concrete substructures to use three salvaged spans from the San Carlos Bridge at two locations in the Prescott National Forest in Yavapai County. Laborers enlisted from the Arizona Transient Camp dismantled the San Carlos Bridge that summer and built the Perkinsville [9474] and Walnut Creek bridges. The two structures have since functioned unaltered at these relatively remote forest crossings.

## SIGNIFICANCE STATEMENT

One of Arizona's few multiple-span through trusses, the San Carlos Bridge in its original location was historically significant as a regionally important river crossing. It is further distinguished as the earliest dateable OIA span in the state. The re-erection of these three trusses in the Prescott National Forest marked a part of a cooperative program developed in 1934 by the Arizona State Transient Directors and the US Forest Service to provide suitable labor projects for the "vast army of unemployed transients" housed in transient camps across the state. Although other such transient-built public works undoubtedly still remain in Arizona, these are the only known examples of bridges constructed as part of this federal/state relief program. The two bridges are technologically noteworthy as the earliest example in the state of one of the most common vehicular truss types built in America—the riveted Pratt through truss.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

- ☒ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

- individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering

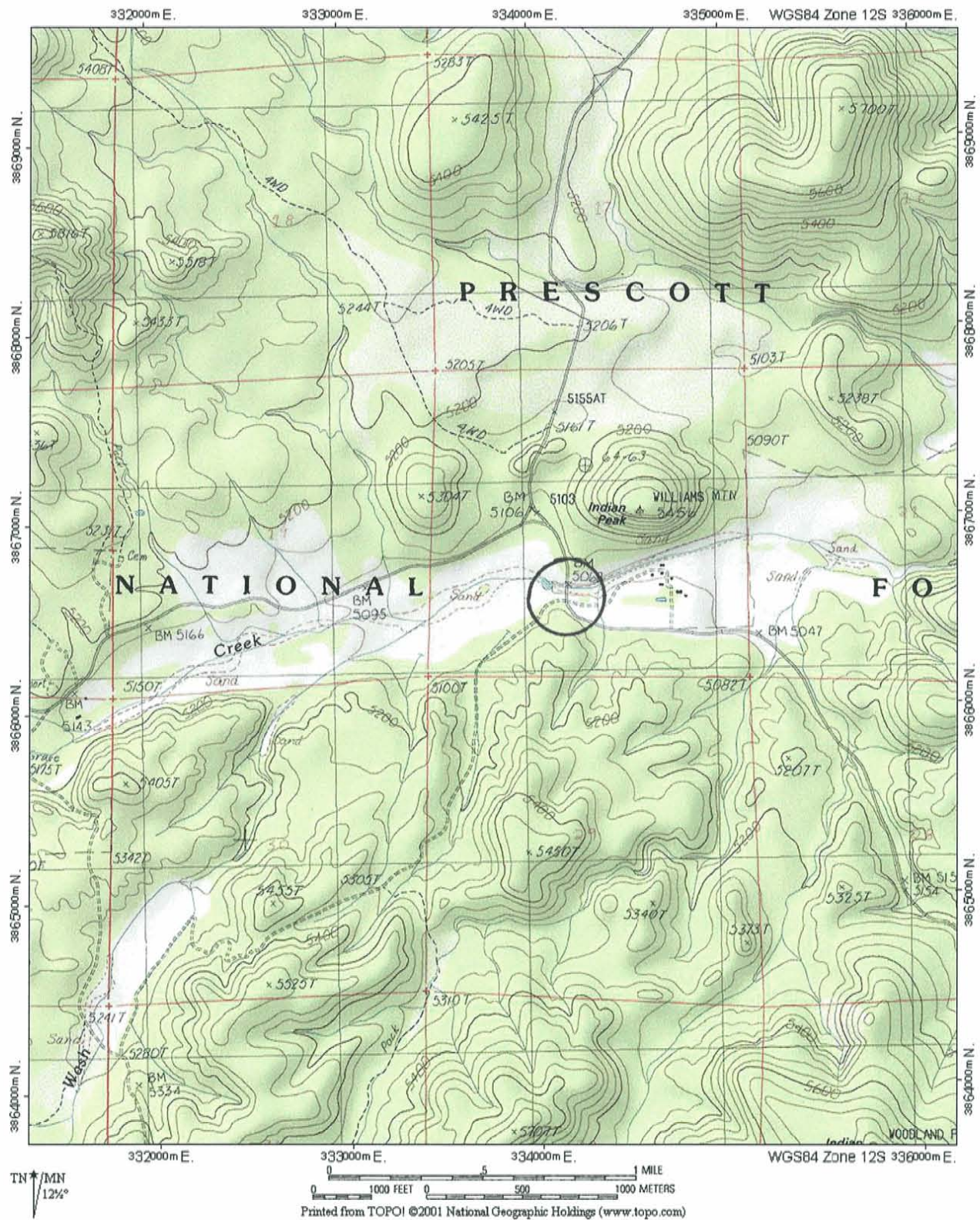
PERIOD OF SIGNIFICANCE: 1913-1964

THEME(S): Transportation: Highways



# WALNUT CREEK BRIDGE

Structure No. 8741





# HISTORIC BRIDGE INVENTORY

## Perkinsville Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	09474
milepost	0.00	inventory route	Perkinsville Road
location	18.8 mi SE Jct SR 89	feature intersected	Verde River
city/vicinity	Perkinsville	USGS quadrangle	Perkinsville
district	88	UTM reference	12.389835.3862085

### STRUCTURAL INFORMATION

main span number	2	main span type	310
appr. span number	2	appr. span type	101
degree of skew	0	guardrail type	6
main span length	138.0	superstructure	steel rigid-connected Pratt through truss
structure length	330.0	substructure	concrete abutments, wingwalls and spill-through pier
roadway width	14.0	floor/decking	timber deck over timber stringers
structure width	18.4	other features	upper chord: 2 channels w/ cover plate and lacing; lower chord: 4 angles w/ batten plates; vertical: 2 channels w/ lacing; diagonal: 2 - 4 angles w/ lacing; lateral bracing: 1 angle; floor beam: I-beam; Thrie beam guardrails

### HISTORICAL INFORMATION

construction date	1913	designer/engineer	US Office of Indian Affairs
project number		builder/contractor	Midland Bridge Company, Kansas City MO
information source	ADOT bridge records	structure owner	Yavapai County
alteration date(s)	1936	alterations	truss superstructure moved to this location

### NATIONAL REGISTER EVALUATION

inventory score	80	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u>  </u> C <u>x</u>
		signif. statement	outstanding example of early standard truss bridge type

### FORM COMPLETED BY

Clayton B. Fraser, Principal

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420 South County Road 23E  
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31 October 2004



## PERKINSVILLE BRIDGE

Structure No. 9474



### PHOTO INFORMATION

date of photo.: November 2002

view direction: southeast southwest

photo no.: 02.11.236 02.11.237



## CONSTRUCTION HISTORY

In 1912 Arizona Congressman Carl Hayden passed legislation authorizing the Secretary of the Interior to investigate the necessity for a "suitable steel and concrete wagon bridge" across the Gila River on the San Carlos Indian Reservation. Responsibility for locating and designing the Gila River Bridge fell upon the Indian Office in Washington, D.C. Rather than place the bridge on the Reservation, OIA engineers located it more than 20 miles upriver near Calva. As delineated by OIA in July 1913, the bridge was comprised of seven Pratt through truss spans, each extending 138 feet, for an overall length of almost 1,000 feet. To fabricate and erect the trusses, OIA contracted with the Midland Bridge Company of Kansas City. During the fall of 1913 Midland shipped several carloads of steel to the site by rail and began truss erection. The San Carlos Bridge was reported complete by the end of the year.

The bridge carried traffic until the south approach was washed away in a 1915 flood, rendering it impassible. For some reason, the OIA waited until February 1921 to reopen the bridge by erecting four new through trusses. In 1935 the agency decided to replace the bridge entirely. In January 1936 Arizona Highway Department Bridge Engineer Ralph Hoffman designed new concrete substructures to use three salvaged spans from the San Carlos Bridge at two locations in the Prescott National Forest in Yavapai County. Laborers enlisted from the Arizona Transient Camp dismantled the San Carlos Bridge that summer and built the Perkinsville and Walnut Creek [8741] bridges. The two steel structures have since functioned unaltered at relatively remote forest crossings.

## SIGNIFICANCE STATEMENT

One of Arizona's few multiple-span through trusses, the San Carlos Bridge in its original location was historically significant as a regionally important river crossing. It is further distinguished as the earliest dateable OIA span in the state. The re-erection of these three trusses in the Prescott National Forest marked a part of a cooperative program developed in 1934 by the Arizona State Transient Directors and the U.S. Forest Service to provide suitable labor projects for the "vast army of unemployed transients" housed in transient camps across the state. Although other such transient-built public works undoubtedly still remain in Arizona, these are the only known examples of bridges constructed as part of this federal/state relief program. The two bridges are technologically noteworthy as the earliest example in the state of one of the most common vehicular truss types built in America—the riveted Pratt through truss.

## NATIONAL REGISTER EVALUATION

## TECHNOLOGICAL SIGNIFICANCE

☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

## HISTORICAL SIGNIFICANCE

☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

## NATIONAL REGISTER CRITERIA

☒ Criterion A  
☐ Criterion B  
☒ Criterion C

## NATIONAL REGISTER ELIGIBILITY

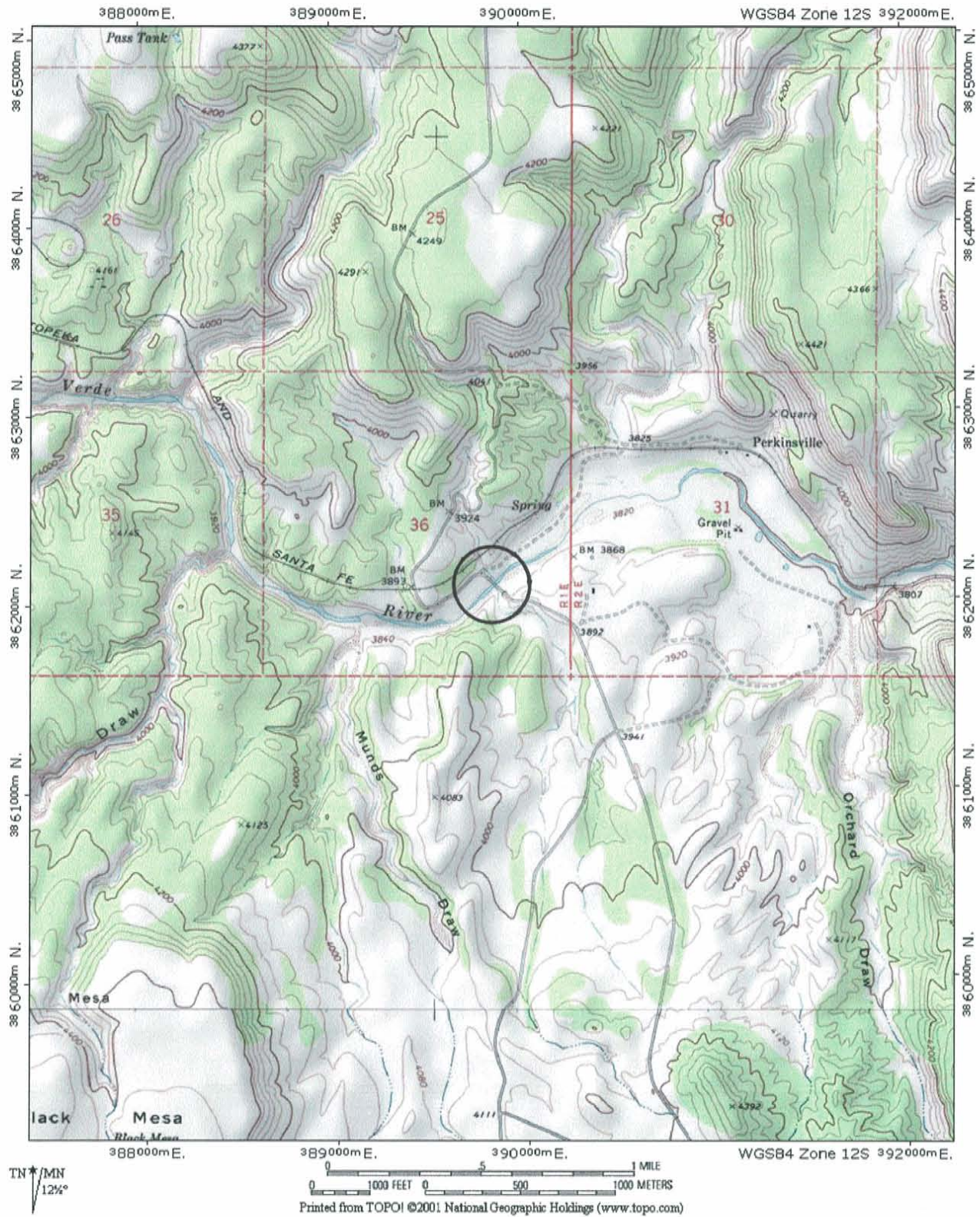
individually eligible ☒ yes ☐ no  
 contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
 PERIOD OF SIGNIFICANCE: 1913-1964  
 THEME(S): Transportation: Highways



# PERKINSVILLE BRIDGE

Structure No. 9474



# HISTORIC BRIDGE INVENTORY

## Hell Canyon Bridge

### PROPERTY IDENTIFICATION

county	Yavapai	inventory number	abd.
milepost	0.00	inventory route	abd. US 89
location	0.5 mi SW of Drake	feature intersected	Hell Canyon
city/vicinity	Drake	USGS quadrangle	Paulden
district	86	UTM reference	12.373842.3871603

### STRUCTURAL INFORMATION

main span number	5	main span type	103
appr. span number	0	appr. span type	
degree of skew	0	guardrail type	0
main span length	50.0	superstructure	concrete two-beam deck girder
structure length	230.0	substructure	concrete abutments and wingwalls w/ tapered spill-through concrete piers
roadway width	19.5	floor/decking	concrete deck
structure width	22.0	other features	two-girder superstructure with arched girders; moulded concrete guardrails w/ paneled concrete bulkheads and square balusters

### HISTORICAL INFORMATION

construction date	1923	designer/engineer	Arizona Highway Department
project number		builder/contractor	L.C. Lashmet Company, Prescott AZ
information source	ADOT bridge records	structure owner	Yavapai County
alteration date(s)		alterations	

### NATIONAL REGISTER EVALUATION

inventory score	83	For additional information, see "Vehicular Bridges in Arizona 1880-1964" National Register Multiple Property Documentation Form	
		NRHP eligibility	listed
		NRHP criteria	A <u>x</u> B <u>  </u> C <u>x</u>
		signif. statement	undistinguished, relatively late example of uncommon structural type, undocumented

### FORM COMPLETED BY

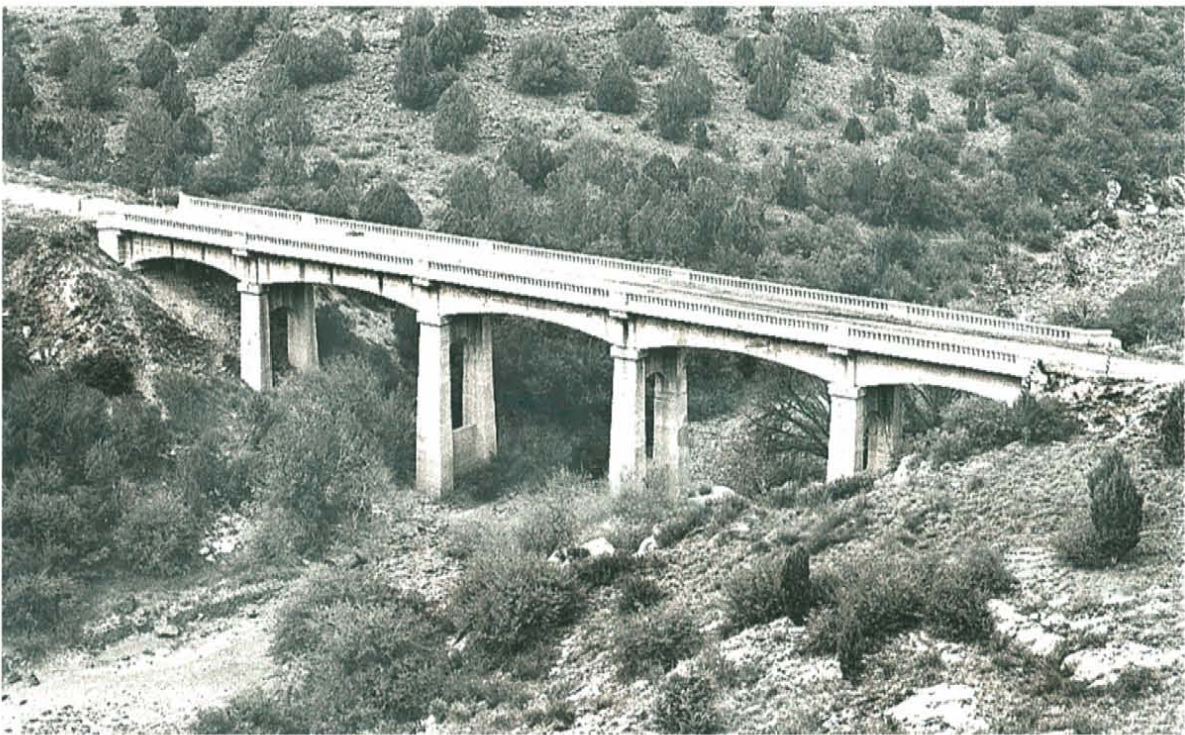
Clayton B. Fraser, Principal

FRASERdesign  
420 South County Road 23E  
Loveland, Colorado 80537  
31 October 2004



# HELL CANYON BRIDGE

Structure No.: abandoned



## PHOTO INFORMATION

date of photo: November 2002

view direction: west north

photo no.: 02.11.156 02.11.157



# HELL CANYON BRIDGE

Structure No.: abandoned

## CONSTRUCTION HISTORY

In the early 1920s the Arizona Highway Department undertook extensive road construction to build the 50-mile Prescott-Ash Fork Highway. The largest of the drainage structures in the project spanned Hell Canyon, a rugged wash near Drake, just north of the famous Santa Fe Railroad trestle. AHD bridge engineers initially designed and contracted for a 154-foot open spandrel arch similar to other bridges over Cienega Creek [8293] and Queen Creek [abd.] then underway. Additional substructural investigation, however revealed that the bridge's south abutment would rest on a sizeable boulder field, providing an unstable foundation condition for an arch of that scale. Late in 1922 State Engineer W.C. Lefebvre changed the bridge's design to this multiple-span concrete girder with high concrete piers. Each span featured two slightly arched girders that bore directly on the tapered concrete piers. The 20-foot-wide concrete roadway was bounded by concrete guardrails with paneled bulkheads and square balusters. Using most of the reinforcing steel already on-site, contractor L.C. Lashmet began construction of the Hell Canyon Bridge on January 15, 1923. His crew completed the structure on July 12 for a total cost of just over \$34,000. The Hell Canyon Bridge functioned on U.S. Highway 89 until its replacement by a route realignment in 1954. It now stands abandoned and closed to vehicular traffic.

## SIGNIFICANCE STATEMENT

"The high trestle has a very pleasant effect, with the arched girders on the high, slightly tapered piers," Lefebvre stated. "It was completed at approximately the same contract price as was the bid for the arch and compares favorably with it in every aspect." A major crossing on one of the state's important early regional routes, the Hell Canyon Bridge is significant as an outstanding representative of an unusual structural type. Although numerous concrete girder bridges were built throughout the state in the 1920s and 1930s, most featured designs with four or more relatively shallow girders. The earliest bridges built in the 1910s typically employed two-girder designs, and of these only two remain. The Hell Canyon Bridge is a throwback to this earlier design, made necessary by the need to use available materials then on the ground at the site. It is distinguished by its picturesquely arched girders and handsomely proportioned piers. A visually striking structure, the Hell Canyon Bridge is an important remnant of early highway construction in Arizona. In pristine structural condition, the structure accrues an additional degree of integrity of setting from the fact that the adjacent roadway is relatively unimproved. US 89 was rerouted before it was paved along this stretch, leaving the road and bridge in essentially original condition. The Hell Canyon Bridge is among a small number of early structures that convey a feeling of what it was like to travel Arizona's state highways in the 1920s and 1930s.

## NATIONAL REGISTER EVALUATION

### TECHNOLOGICAL SIGNIFICANCE

- ☐ represents the work of a master  
☐ possesses high artistic values  
☒ represents a type, period or method of construction

### HISTORICAL SIGNIFICANCE

- ☐ associated with significant persons  
☒ associated with significant events or patterns  
☐ contributes to historical district

### NATIONAL REGISTER CRITERIA

- ☒ Criterion A  
☐ Criterion B  
☒ Criterion C

### NATIONAL REGISTER ELIGIBILITY

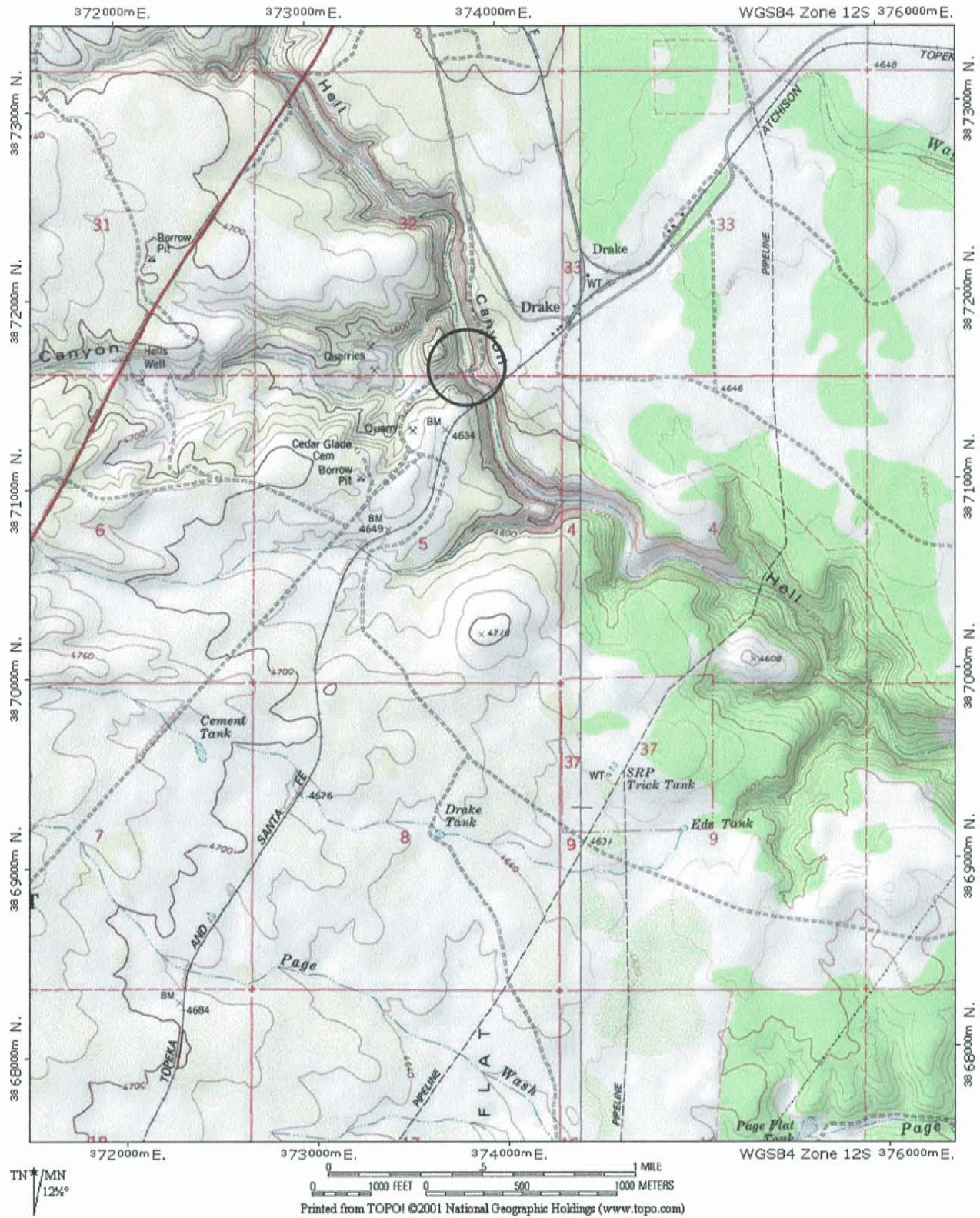
- individually eligible ☒ yes ☐ no  
contributes to district ☐ yes ☒ no

AREA OF SIGNIFICANCE: Transportation; Engineering  
PERIOD OF SIGNIFICANCE: 1923-1964  
THEME(S): Transportation: Highways



# HELL CANYON BRIDGE

Structure No.: abandoned



Location Map