NPS Form 10-900-b (Rev. 01/2009) OMB No. 1024-0018 (Expires 5/31/2012)

United States Department of the Interior
National Park Service

National Register of Historic Places Multiple Property Documentation Form

This form is used for documenting property groups relating to one or several historic contexts. See instructions in National Register Bulletin *How to Complete the Multiple Property Documentation Form* (formerly 16B). Complete each item by entering the requested information. For additional space, use continuation sheets (Form 10-900-a). Use a typewriter, word processor, or computer to complete all items

X New Submission _____ Amended Submission

A. Name of Multiple Property Listing

Montana's Historic Steel Stringer and Steel Girder Bridges, 1901-1961

B. Associated Historic Contexts

The Counties and Steel Bridge Construction, 1901-1915

The Montana Highway Department, 1916-1961

C. Form Prepared by

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D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR 60 and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.
(_____ See continuation sheet for additional comments.)

Signature and title of certifying official | Date

State or Federal Agency or Tribal government

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Signature of the Keeper Date of Action

Table of Contents for Written Narrative

Provide the following information on continuation sheets. Cite the letter and title before each section of the narrative. Assign page numbers according to the instructions for continuation sheets in National Register Bulletin *How to Complete the Multiple Property Documentation Form* (formerly 16B). Fill in page numbers for each section in the space below.

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.).
Estimated Burden Statement: Public reporting burden for this form is estimated to average 18 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, PO Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503

E. STATEMENT OF HISTORIC CONTEXTS

Historic bridges are a prominent and significant part of the Montana landscape. Steel stringer and steel girder bridges represent an alternate structural type that, like truss bridges, not only delineated the sites of important river crossings in an area, but also represent the evolution of Montana's transportation system. Unlike the steel truss bridges, steel stringer and steel girder structures did not have the height and width restrictions of truss bridges and were better suited to the evolving post World War II economy. The Montana Historic Steel Stringer and Steel Girder Multiple Properties Document (MPD) addresses those types of bridges built in the state between 1901 and 1961, after which the type was largely supplanted by prestressed concrete bridges and the Interstate highway system in the state. Unlike steel truss bridges, steel stringer and steel girder bridges did not exhibit any differentiation in styles and represented a uniformity of design that perhaps best characterized the standardization of design sought by highway engineers. Steel stringer bridges consist, simply, of steel I-beams with the ends resting on abutments. Girder bridges are somewhat more complicated consisting of deep steel beams supported by systems of I-beams and floor beams. The glossary at the end of Section E of this document provides definitions of terminology used in this document.

Introduction

Army civil engineer John Mullan built the first bridges in western Montana in 1860. The primitive log structures crossed the St. Regis-DeBorgia River and nearly all of them washed out during the spring run-off in 1861. Mullan diligently replaced the bridges and built a six-span log structure across the Blackfoot River near present Missoula during the winter of 1862. The Blackfoot River Bridge was an important component of the Mullan Military Road until 1868 when high water destroyed the structure; Missoula County temporarily replaced it with a ferry. Although Mullan's bridges were simple timber stringer structures, their basic design was the ancestor of the steel stringer bridges that would be constructed in Montana in great numbers beginning in 1901. A rich gold strike in southwestern Montana in July 1862 caused a stampede that brought hundreds of newcomers into what had before been a sparsely settled region. Additional gold strikes in 1863 and 1864 caused bigger stampedes to Montana. By late 1864, newly-established Montana Territory boasted a population of around 28,000 people. Transportation was critical to the prosperity of the new territory, so, in December 1864, the first territorial legislature licensed nearly two dozen companies to build toll roads and bridges. None of the bridges, however, were designed by an engineer with the result they often failed or were in such poor condition that users frequently complained to the legislature about them. By 1872, user complaints and high tolls compelled the legislature to abolish the toll road system in Montana. The counties assumed control of the territory's roads and bridges and taxed their residents to maintain them. By the early 1880s, Montana was crisscrossed by a network of roads and timber bridges that were, for the most part, in deplorable condition. The remoteness of the territory, the nascent agricultural industry, and the decline of mining made the improvement of the system impractical until the territory could be connected to the rest of the country by a better and more reliable means of transportation, the railroads.[1]

The completion of the Utah and Northern Railroad in 1881, the Northern Pacific Railway in 1883, and the St. Paul, Minneapolis and Manitoba Railroad (later the Great Northern) in 1887, significantly changed the way Montanans conducted business and moved around the territory. Instead of by road or steamboat as previously occurred, most of the commercial freight moved through the state over one of those rail lines by the late 1880s. The railroads caused Montana's road system to function more as farm-to-market routes that provided access to the railroads than as an inter and intra-state system. The counties expended little on roads and bridges during that period. Eventually, however, good bridges would be critical to the economic prosperity of the territory. The railroads significantly changed Montana's transportation landscape and caused a profound change in the system by allowing the cheap importation of steel and other materials necessary for an evolving road network. The railroads caused a boom in vehicular steel bridge construction in the territory that began with the construction of a bridge over the Missouri River at Fort Benton.

[1] Jon Axline, *Conveniences Sorely Needed: Montana's Historic Highway Bridges, 1860-1956*, (Helena: Montana Historical Society, 2005), 12-13, 1, 20; Michael P. Malone, Richard B. Roeder, and William L. Lang, *Montana: A History of Two Centuries*, Rev. ed., (Seattle: University of Washington, 1991), 68; Patricia M. Ingram, *Historic Transportation Routes Through Southwestern Montana*, (Boulder CO: Western Interstate Commission for Higher Education, 1976), 57-61.

Constructed in 1888, the Fort Benton Bridge was the first all-steel bridge in Montana. The bridge (24CH335; listed 1980), which still stands, had a substantial impact on the economy of Fort Benton, a former river port that transitioned into a major agricultural trade community because of the bridge and the community's location on the Manitoba Railroad.[2]

The Fort Benton bridge marked the beginning of a new era in bridge construction in Montana, one based on modern engineering principals and the use of structural steel rather than wood. Steel became the material of choice for bridges and the Northern Pacific and Great Northern railroads could easily haul it to Montana from fabrication plants in the East and Midwest. Along with prominent steel truss structures across major river crossings, Montana counties would also eventually utilize simple timber, steel stringer and reinforced concrete bridges on important farm-to-market roads. The immigration of people to Montana after the completion of the railroads put pressure on the county governments to provide a modern infrastructure for their constituencies. The railroads provided access to Montana for Midwest-based bridge construction companies, who could economically ship steel bridge components to the state at prices the counties could afford. Because of the large numbers of different types of steel bridges built, the period from 1892 to 1915 was a golden age for the bridge construction companies in Montana. Many of the bridges built by the counties still survive and are representative of practical bridge technology at the turn of the twentieth century. The structural components were easily moved to the construction site, structurally reliable, functional, and economical – four factors critical to their acceptance by Montana's county commissioners.[3]

The Counties and Steel Bridge Construction, 1901-1915

The counties maintained funds specifically for bridge maintenance and construction. They obtained money from annual road taxes levied against the property owners. If the county's funds included enough money, the bridge would be paid directly out of that source. Oftentimes, however, and especially in the Yellowstone, Clark Fork, and Milk River valleys, the cost of the proposed bridge often exceeded the money available in the Bridge Funds. In those instances, the county commissioners called for bond elections to raise money for the projects. Most county bond elections for new bridges passed, demonstrating the need for the structures and the willingness of citizens to pay for them. Once the commissioners determined a bridge could be built and had the money to pay for it, they directed the County Surveyor to ascertain the type of bridge needed as well as length and width. The County Surveyor could choose an appropriate design from catalogs provided by the companies. The bridge company agents collaborated on the details of the bridges, including the actual structural designs, with the County Surveyor.[4]

While steel truss bridges were big ticket items for the counties before 1915, steel stringer bridges were shorter in length, relatively inexpensive and did not require large outlays of money by the counties. Steel girder bridges, however, were rarely constructed by the counties, which, instead built steel truss structures during this period. But as the number of county residents increased after 1900 and especially after 1909 with the passage of the Enlarged Homestead Act, the priorities and economies of the county commissioners shifted to accommodate their new constituents. Between 1900 and 1910, Montana's population increased to just over 376,000 people, many located in the rural counties of the east. The population more than doubled between 1910 and 1918 when 400,000 would-be homesteaders arrived in Montana, significantly changing the demographics of the state. Although steel truss bridges still served as an important component of the commissioners' plans to provide an efficient infrastructure to its constituents, they increasingly built smaller and simpler structures to provide access over smaller obstacles, such as creeks, coulees, and ravines. In timber-poor eastern Montana, the commissioners built large numbers of steel I-beam stringer bridges on farm-to-market roads to facilitate the transportation of agricultural products and people between the rural areas and the towns. Many of these structures consisted simply of steel I-beam stringers placed atop timber or concrete abutments. Some displayed steel angle section guardrails and some had no guardrails at all, but all had timber decks. These structures usually cost less than $5,000 to construct and were built by county crews or by local residents working off their annual road taxes. Custer County built the first known steel stringer bridge (24CR761) across Locate Creek in 1901. Over the next 14 years, it built at least 17 steel stringer bridges in the county. All structurally identical, the only differences between them were the type of abutments and

[2] Fredric L. Quivik, *Historic Bridges of Montana*, (Washington DC: National Park Service, 1982), 24, 27.

[3] Fredric L. Quivik, *Historic Bridges of Montana*, (Washington DC: National Park Service, 1982), 24, 27.

[4] Axline, *Conveniences Sorely Needed,* 142 n2.

the guardrails. The increase in the construction of steel stringer bridges cemented their importance as part of the state's transportation landscape during the first two decades of the twentieth century.[5]

The Montana Highway Department, 1916-1961

Montana's Thirteenth Legislature created the State Highway Commission in March 1913, which caused a profound change in Montana's transportation landscape. The commission resulted from many years' lobbying by state good roads groups to develop engineering standards for roads and impose order on the bridge-building industry. Importantly, the Congress' impending passage of the first Federal Aid Road Act in 1916 made it mandatory that states establish state highway commissions to manage the federal funds. When formed in 1913, the commission consisted of three civil engineers appointed to the position by the governor. At first, the commission served in an advisory capacity that provided information on modern road construction techniques to the state's counties. It published pamphlets (one with the compelling title of "Drainage of Roads"), developed a statewide highway map, and met with local governments about their transportation needs. Even with the state's increased influence on road and bridges matters, the counties continued to follow the old system of advertising and letting contracts for new bridges because of the scarcity of state money available to them for construction.[6]

In March 1915, the Montana legislature stipulated the highway commission form a bridge department. The highway commissioners hired civil engineer Charles A. Kyle to head up the department because of his extensive experience in the design and construction of steel bridges. Over the next month, the commissioners and Kyle hammered out the details of Montana's new bridge-building system, which included guidelines for letting contracts and distribution of standardized bid sheets to all the counties. Kyle devised standardized designs for steel truss, timber, reinforced concrete, and steel stringer bridges. Although the county courthouse housed the bridge plans, the commission required contractors to obtain final plans from the bridge department in Helena to ensure the contractors built the bridge to the specifications defined in the standard plans. The counties remained responsible for letting the contracts and paying for the structure. The state, however, supervised the construction and inspected the bridges before authorizing payments to the contractors.[7]

By the end of its first year, the commission's bridge department worked through the procedural details of its new system and regularly provided plans to the counties for steel truss bridges. The commission promoted Kyle to Chief Bridge Engineer and authorized him to hire "competent engineers to supervise the construction of new steel bridges" in the state. Indeed, by the end of 1915, Kyle and his assistants oversaw the counties' construction of nearly seventy steel bridges in the state, including one steel stringer structure. The department's engineers designed steel stringer or reinforced concrete bridges for crossings of less than forty feet; trusses were used for crossing more than that width. The first steel

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[5] Malone, Roeder and Lang, *Montana*, 242.

[6] Montana State Highway Commission Meeting Minutes, Book 1, 13-15, 67; *Laws, Resolutions, and Memorials of the State of Montana Passed by the Thirteenth Regular Session of the Legislative Assembly*, (Helena: State Publishing Co., 1913), 318-326; M. J. Steere, *History of the Montana State Highway Department, 1913-1942*, (Helena: State Highway Commission, 1943), 9-12.

[7] Little is known about Charles A. Kyle. Born in Canada in January 1864, he immigrated to the United States with his family in 1869. By 1900, he had married and worked as a civil engineer in Chicago and, by 1910, Utah. In May 1915, he inquired about a new position as the bridge engineer for the Montana State Highway Commission. He accepted the job a week later at an annual salary of $2,500. Chief Engineer George Metlen called Kyle "a structural steel designer of many years successful experience both in designing and building steel and concrete structures." Kyle was responsible for standardizing steel, timber, and concrete bridge designs for the commission from 1915 to 1917. He also attended many of the contract letting meetings in the counties, and oversaw the bidding process. In 1916, he became Chief Bridge Designer when the highway commission demoted Metlen to Bridge Engineer. When the highway commission sacked Metlen in 1918, Kyle resumed his position as Bridge Engineer. Kyle continued his employment with the highway commission until 1919 when he left to seek other business opportunities in Boise, Idaho. Kyle died in Idaho in January 1936. State Highway Commission Meeting Minutes, book 1, pp. 70, 71, 72, 124-125, 178; Metlen, *Report of the Montana State Highway Commission*, 5-8; US Census Records, 1880, 1900-1930, Montana Historical Society, Helena.

stringer bridge built from the bridge department's standardized design crossed an unknown drainage in Sheridan County in 1916. It is not known how many steel stringer bridges the highway commission constructed between 1916 and 1920.[8]

The Montana Highway Department Bridges, 1920s

The 1920s marked a transitional period in the construction of bridges in Montana. Changes in the organization and funding of the Federal Aid highway system by Congress in 1922 and 1926 had a profound effect on Montana, the State Highway Commission, and the counties. Prior to the formation of the Montana Highway Department in 1917, all activities occurred under the aegis of the highway commission, known collectively as the State Highway Commission. With the creation of the department, however, the highway commission became responsible for the political agenda of road and bridge building as well as awarding contracts, managing the department's budget, setting policies, and coordinating with the federal Bureau of Public Roads (BPR). The highway department was responsible for the actual design, construction, and maintenance work on Montana highways. The department operated under the direction of the Chief Engineer, who supervised other department heads, including the bridge department. The Chief Engineer was responsible for ensuring that the highway department carried out the program set by the highway commissioners. Both the commission's and highway department's relationship with the BPR became more formalized in the Twenties. The BPR channeled federal funds to the state, approved all projects scheduled by the department, and provided the final approval of plans developed by the state's bridge department. The process of road and bridge building in Montana became much more bureaucratically structured in the 1920s as the federal government channeled more money into the state for that purpose.[9]

The Federal Aid Act of 1921 and its 1922 amendment more than doubled the federal allocation for road and bridge construction in Montana. Although the commission used most of the money for road improvements, a substantial amount found its way into the highway department's bridge budget. Prior to 1926, the counties were responsible for the construction of roads and bridges within their jurisdictions. Increasingly during the 1920s, however, the state took gradual control of highway and bridge construction in Montana by reducing the amount of matching funds needed by the counties. The counties served nominally as the lead in the process, but the highway commission controlled the purse strings. In 1926, the commission assumed control of the entire preconstruction and construction process – including payment for the project with federal and state funds. The counties still provided partial funding of bridges, but the commission through the highway department managed the contracts with the builders and decided the location of the bridges.

Because of increased federal funding, the 1920s was a decade of tremendous expansion for Montana's highway system. By 1928, the highway commission had improved over twenty percent of the state's 4,673 miles of road by straightening dangerous alignments, grading, improving drainage, installing guardrails, and surfacing dirt roads with gravel, scoria, asphalt, and, occasionally, concrete. It also constructed nearly 400 bridges, but less than 20% were steel stringer structures and none were steel girder bridges. Even with the improvements, however, Montana's roads clung to the reputation of being truly abysmal. Western writer Hoffman Birney complained in 1930 that Montana's roads were the "poorest of any state in the Union. Even the glorious scenery of the Rockies can't entirely make up for ruts, chug-holes, mud, and detours to say nothing of broken springs or stone-bruised tires." Sturdy, resilient, and less prone to wash-outs than they had been in the past, bridges fared much better than the roads. Many of the bridges built by the highway department in the 1920s were still in use on the state's highway system at the turn of the 21st century.[10]

The Great Depression, 1930-1941

The Great Depression devastated Montana. Drought and declining prices for agricultural goods, copper, timber, and oil

[8] The highway commission generally used steel stringers for approach spans to steel truss bridges. Montana State Highway Commission Meeting Minutes, book 1, p. 93; "Bridge Building in Montana," *Dillon Examiner* (15 December 1915); Metlen, *Report of the Montana State Highway Commission*, 5, 10; *Second Biennial Report State Highway Commission of Montana, 1919-1920*, (Helena: State Highway Commission, 1920), 63-65.

[9] Steere, *History of the Montana State Highway Department*, 19-21, 23.

[10] Axline, *Conveniences Sorely Needed*, 81-82; Hoffman Birney, *Roads to Roam*, (Philadelphia: The Penn Publishing Company, 1930), 162.

put thousands of Montanans out of work and their families in desperate need of relief. Ironically, hard times contributed to the transformation of Montana's transportation system from one of the worst in the United States to one of the nation's best in less than a decade. President Franklin Delano Roosevelt's New Deal programs put unemployed Montanans to work on a variety of public works projects, including improvement or construction of the state's roads and bridges. The transformation, however, was not always easy as federal and state governments struggled to work out the details of the funding formulas, strict employment guidelines, and set priorities for the road and bridge building programs.

The Great Depression, however, marked a period of consolidation as economic calamity forced the Montana and federal governments to improve the system through emergency make-work projects. The construction materials remained the same, but many of the designs were modified and simplified to make them easier to construct and less expensive to build. The bridges of the 1930s fit perfectly with the decade – they were spare in appearance and functional in design. Because of the simplicity and relative ease of assembly, they were perfect for the federal government's make-work programs of the Great Depression

From 1930 to 1941, the Montana Highway Department built nearly 3,000 miles of road and 1,278 bridges, many of which still survive on the state's two lane roads. The federal government believed one path to economic recovery was highway projects. Only about seventeen percent of the bridges built by the department during the 1930s were reinforced concrete, steel truss, steel stringer, and girder bridges. Most were inexpensive timber structures designed to span the countless creeks and dry coulees in eastern Montana. They also met the intent of the federal government's economic relief programs: they required large numbers of laborers. While not structurally distinctive, timber bridges, like steel stringer bridges, played a vital role in the state's economic recovery by putting hundreds of unemployed men back to work.[11]

Benedict J. Ornburn supervised the highway department's expanded bridge department from 1929 to 1941. Born in Granville, Missouri, in 1900, he attended the University of Missouri and, after graduation, worked for the Missouri Highway Department. In November 1929, Chief Engineer Ralph Rader hired Ornburn as a design engineer for the Montana Highway Department. The highway commissioners promoted him to Chief Bridge Engineer of the highway department in 1935. Ornburn formulated very specific ideas about which designs were appropriate for specific locations. He was also well aware the public was interested in bridge aesthetics. In 1938, engineer Vere Maun wrote in the highway department's newsletter, *The Center Line*, that "In recent years both engineers and the public have become more critical of the appearance of bridges and are asking that where possible, they harmonize with the surroundings." Ornburn certainly influenced Maun's faith in the "good appearance" of bridges, since his designs included "simple lines" that kept the structures "in proportion to [their] environment." That philosophy, promoted by Ornburn, served as the guiding principle for the bridge department during the 1930s. Maun's comments about "simple lines" applied specifically to steel stringer and steel girder bridges. Increasingly during the decade, highway department engineers discarded the expensive and spatially limited steel truss bridges in favor of more economical and utilitarian steel stringer and girder structures.[12]

Within three months of his inauguration in March 1933, President Franklin Roosevelt pushed through legislation creating the National Industrial Recovery Act (NIRA). Title II of the Act created the Public Works Administration (PWA), which distributed $400 million allocated to the states for public works projects, including roads and bridges. Montana received nearly $7.5 million from the PWA specifically for road and bridge construction. The PWA initiated the greatest boom in road and bridge construction yet seen in Montana. By the time the U.S. Supreme Court declared the NIRA unconstitutional in May 1935, the Montana Highway Department oversaw the construction of 228 bridges, including five steel stringer and four steel girder structures. Prior federal legislation funded projects only on the state's primary highway

[11] Steere, *History of the Montana Highway Department*, 55.

[12] "Benedict Joseph Ornburn," *Center Line* 1, no. 5 (May 1938), 2; personnel card no. 6662 on file at MDT, Helena; Montana State Highway Commission Meeting Minutes, book 6, 293-294; Vere P. Maun, "Bridge Building," *The Center Line* 1, no. 5 (May 1938), 34; Montana State Highway Commission Meeting Minutes, Book 5, pp. 243-244; John H. Morrison Interview by Jon Axline, Spring 1994.

system. The NIRA's road and bridge program, however, was the first real federal effort to integrate a system of primary highways, secondary farm-to-market roads, and urban routes into a national transportation system.[13]

It was under the auspices of the NIRA that the highway department built its first steel girder bridge in 1934, a three-span structure that crossed the Tongue River in Miles City (HAER No. MT-119; demolished 2004). Designed by the highway department and built by Miles City contractors Emil Prahl and Henry Sawtell, the bridge included many decorative details not common to girder bridges, specifically scrolled steel brackets supporting the sidewalks flanking the deck, Art deco-influenced concrete guardrails, and lampposts. Because of its location on Main Street in Miles City, the bridge was more ornate than other steel girder bridges in the state, though it sported the standard riveted girders common to that type of bridge built in Montana during the 1930s. The department built 21 additional steel girder bridges between 1934 and 1941.[14]

As the Great Depression wore on, the highway department increasingly moved away from the use of through and pony truss structures because of high construction costs, chronic steel shortages, the dependence on skilled labor, and height and width clearance restrictions. Instead, it reserved trusses for wide river crossings on the Clark Fork, Flathead, Milk, Powder, Bitterroot, and Yellowstone rivers. The most effective bridges for intermediate crossings were steel stringer and girder bridges, which did not have the height restrictions of the trusses nor required as much steel to build a good functional river bridge. In many ways, these types of bridges also fit better with the Montana engineers' policy of building bridges of "honest structural design with simple lines, and . . . good workmanship." Like today's prestressed concrete structures, steel stringer and girder bridges were not much to look at, but they were functional. Montana Highway Department engineers, moreover, favored this type of bridge for overhead railroad crossings instead of the more expensive reinforced concrete.[15]

In May 1935, the U.S. Supreme Court declared most provisions of the National Industrial Recovery Act of 1933 unconstitutional. Consequently, the Roosevelt Administration folded parts of the Public Works Administration into other federal agencies and created new ones, including the Works Progress Administration. Prior to the Supreme Court's decision, however, the Hayden-Cartwright Act of 1934 allocated $200 million to the states for highway safety improvements (Montana received just under $4 million from the legislation). Under the provisions of the Act, the Bureau of Public Roads instructed the Montana Highway Department to provide it with a list of dangerous at-grade railroad crossings and underpasses. In August 1934, the department, through the highway commissioners, submitted the list to the BPR for consideration. With the Court's declaration about the NIRA, the Roosevelt Administration quickly reorganized it and pushed the Emergency Relief Appropriation Act of April 8, 1935 through Congress. The Act provided another $200 million to the states and, importantly, implemented the Works Progress Grade Crossing Highway Program (WPGCH) to provide overpasses or underpasses at high traffic and dangerous railroad crossings. The following month, the highway commissioners reorganized the bridge department and hired more engineers and designers to better handle the increased work load stipulated under the WPGCH. The program occupied much of the time and effort of the enlarged department.[16]

Much of the highway department's initial efforts to provide overhead grade separation structures concentrated on reinforced concrete overpasses. In 1935, the department built eleven reinforced concrete overpasses and only six steel overpasses. Thereafter, however, the number of steel stringer and girder separation structures grew, while the number of concrete overpasses significantly diminished. The highway department built twelve steel stringer and steel girder railroad overpasses between 1935 and 1941, including the Mossmain Overpass (24YL0698). Along with the overhead crossings,

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[13] Axline, *Conveniences Sorely Needed*, 96-98.

[14] Historic American Engineering Record: Tongue River Bridge (HAER No. MT-119). Document on file at the Montana State Historic Preservation Office, Helena.

[15] Maun, "Bridge Building," 34.

[16] T. H. Watkins, *The Great Depression: America in the 1930s*, (Boston: Little, Brown and Co., 1993), 241; Federal Highway Administration, *America's Highways, 1776-1976*, (Washington DC: Government Printing Office, 1976), 125, 130, 265, 270.

the highway department also built twelve underpasses between 1935 and 1938. The underpasses, of which the Orange Street Underpass (24MO361) in Missoula is the best example, consisted of steel stringer roofs and frames encased in concrete.[17]

The replacement of a new bridge over the Yellowstone River near Laurel in 1935 encouraged the city's business and civic leaders to lobby the highway commission for a new railroad overpass on U.S. Highway 10 between Laurel and Billings, one of the most heavily used roads in the state. To make matters worse, motorists had two dangerous at-grade crossings to traverse on what was also a very busy railroad. In July 1935, the Northern Pacific Railway and State Highway Commission designated a grade separation structure project east of Laurel as its number one priority. The overpass was one of the first to be funded under the federal government's Works Progress Grade Crossing program. Ben Ornburn completed the designs for the three-span, 269-foot steel girder structure in May 1935 according to the principals later articulated by his employee bridge designer Vere Maun: a structure that was functional and also visually appealing. On the first day of November 1935, the highway commission awarded the contract to Spokane contractor James Crick for the construction of a 3-span steel stringer overpass at the railroad's Mossmain junction (24YL0698).[18]

Crick began work on the overpass the following month and completed pouring the concrete for the piers by February 1936 when cold weather forced him to suspend work for a few weeks. The contractor used a new type of quick-setting concrete for the piers and deck. During the cold weather months, he encased the concrete piers in heavy building paper and used gas burners, called salamanders, to provide heat to cure the concrete. Despite precautions, though, one of the salamanders overheated and set fire to the wooden forms on one of the piers. By March, the pier had been repaired and work proceeded rapidly on the structure and its approaches. The overpass required nearly 157,000 cubic yards of fill material for the approaches. The soil was obtained on-site by the contractor and piled to 38 feet at its maximum height. The overpass utilized over one million pounds of structural steel on the superstructure and 48 tons of reinforcing steel embedded in the 774 cubic yards of concrete needed for the piers, deck, and guardrails. The overpass carried Highway 10 a maximum of 23 feet over four Northern Pacific tracks. Crick completed the structure in May 1936, fully three months ahead of schedule.[19]

The Mossmain Overpass opened with no fanfare on 23 May 1936. Northern Pacific brakeman George Yerger was first to drive a non-commercial vehicle over the bridge. The *Laurel Outlook* reported that the man "derived quite a thrill from the experiences" as it provided him with an "entirely new view of the far-flung Laurel yards, which he had known intimately for many years." The overpass was the longest and most massive steel girder bridge in the state when completed. Although the double-coursed concrete guardrails have since been replaced by much-less appealing Jersey Rails, the elegant cambered girders and streamlined appearance of the overpass continues to make it an aesthetically pleasing structure.[20]

By December 1941, the highway department constructed ninety steel stringer and steel girder bridges in Montana. That type of bridge constituted only seven percent of the 1,278 bridges built by the department during the Great Depression. The majority of bridges were reinforced concrete and timber stringer structures. The number of steel stringer and girder bridges, however, steadily increased during the decade, until they surpassed the number of concrete bridges built in 1939. The low profile and simple lines of steel stringer and girder bridges best met the intent of the highway department bridge engineers. In 1938, department engineer Vere Maun summed up that policy:

> Good appearance in bridge structures can be obtained by the choosing of the proper type, by careful arrangement and proportioning of spans, honest structural design with simple lines, and by good workmanship. In the Montana Highway Bridge Division several studies are made of a bridge, sketches made, costs of each

[17] Montana Highway Commission Meeting Minutes, books 6-8 (1933-1941); Federal Highway Administration, *America's Highways*, 130.

[18] Axline, *Conveniences Sorely Needed*, 104-105.

[19] Axline, *Ibid*, 105.

[20] Axline, *Ibid*.

layout estimated and other factors considered before a choice is made. Then the layout is chosen that promises the best appearance as well as the most economical and suitable structure.

That type of bridge, moreover, while visually unimpressive, also allowed for longer spans than truss, concrete, and timber bridges, a significant factor in the design and construction of bridges in the state after the conclusion of World War II.[21]

As the 1930s drew to a close and war appeared unavoidable, the priorities of the state highway commissioners and the department engineers were redirected at the direction of the Bureau of Public Roads (BPR). Increasingly, discussions in commission meetings concentrated on the integration of Montana's roads and bridges into a national military strategic highway network. The BPR and Montana highway commission discussed at length which roads in the Treasure State provided the greatest value to the national defense and which roads were of secondary importance to that purpose. Primary highways, like U.S. Highways 10 and 91, best served the nation's interests in the event of a national emergency because of their connections to strategically important places in Montana and their interstate connections. Secondary roads functioned primarily as farm-to-market routes and were not as critical to the defense system. The BPR and state highway commission established three categories of strategically important defense highways in April, 1941. The First Priority highways included U.S. Highway 10 (the main east-west highway in the state later supplanted by Interstates 90 and 94) and Highway 91, which today parallels Interstate 15. These two highways, along with U.S. 87 between the Wyoming border and Billings, provided the necessary interstate connections and linked Butte, Anaconda, Helena, Great Falls, Billings, and the strategically important chrome mines in Stillwater County to the system. Second and Third Priority roads provided connections to important railroad centers and less important manufacturing and mining centers in Montana.[22]

The strategic highway system had a profound impact on Montana's bridge program. Because of the redirection of steel and oil supplies to military industries, the Public Roads Administration (PRA, formerly the Bureau of Public Roads) and the state highway commission prioritized its construction schedule to best meet the needs of the strategic highway system. The War Department deemed projects on First Priority highways as critical to national defense and directed that limited supplies of steel be utilized on those roads first. The highway commission and PRA then prioritized projects on the secondary system based on their proximity to strategically important main roads. As a result, it took years for the contractors to complete some bridge projects because of the unavailability of necessary building materials. Discussions between the commissioners and the highway department's engineers involved the modifications of existing roads and bridges to carry heavy military loads and debate on whether to post guards at important highway bridges in the event the United States became involved in the war.[23]

The Japanese attack on Pearl Harbor and Hitler's declaration of war against the United States ended the bridge-building boom, which peaked in 1936 and transformed Montana's transportation landscape. The Public Roads Administration, state highway commission, and the highway department built nearly 1,300 bridges of all shapes, sizes, and types between 1930 and 1941. Bridges built in the counties on what would later become Federal Aid highways and "feeder" roads in the late nineteenth and early twentieth centuries were replaced by the department in an effort to modernize the state's roads. Much of the program intended to make Montana's highways safer by providing sturdy and reliable timber, steel, and reinforced concrete bridges. Steel and reinforced concrete grade separations, moreover, provided safer crossings at busy railroad crossings.

World War II and the Post-War Years

Within weeks of the Japanese attack on Pearl Harbor on December 7, 1945 and President Franklin Roosevelt's declaration of war the following day, the highway commissioners canceled all bridge projects scheduled for construction

[21] Maun, "Bridge Building," 34.

[22] Montana State Highway Commission Meeting Minutes, Book 8, pp. 242-243, 298-299.

[23] Steere, *History of the Montana State Highway Department*, 38-39; Montana State Highway Commission Meeting Minutes, Bok 8, p. 395; Planning Survey Division, *Montana Highway History, 1943-1959*, (Helena: State Highway Commission, 1960), 1-2.

for the next few years, but allowed completion of those already underway. Only those projects essential to the national defense were certified by the War Department. Unless the highway or bridge was located on a Priority One road of the Strategic Highway Network, the Army and Navy would not authorize the expenditure of federal funds. In Montana, only projects on U.S. Highways 10 and 91 fell into that category. The military retained strict control of steel, restricting its use for projects deemed essential to the war effort. As the highway department's demanding program during the Great Depression faded, it encouraged its employees to find work in the war industries, promising them their jobs when the "national emergency" ended.[24]

Although Montana was traversed by three major east-west routes (U.S. Highways 2, 10, and 12), only US 10 connected important commercial, industrial, and population centers in the state. The highway, later bypassed by Interstates 90 and 94, linked rail centers and oil refineries in Billings and Laurel to the Butte mines, Anaconda smelter, and the sawmills around Missoula to the west coast. By contrast, Highways 2 and 12 passed through sparsely populated agricultural centers. The main north-south route in the state, U.S. Highway 91 provided a connection between Salt Lake City and the Canadian border that included Butte, Helena, and Great Falls. Because the War Department determined U.S. Highways 10 and 91 critical to the national defense, the highway commission allocated more money to road and bridge projects on those routes than on other roads in the state from 1942 to 1956.

By 1944, as victory against the Axis powers appeared imminent, Congress began planning for the post-war years. To that end, it passed the Federal Highway Act of 1944, which provided the foundation for the post-war highway-building boom by allocating $1.5 billion to the states for road and bridge construction. The money, however, would not become available to them until after the conclusion of the war. Importantly, the Act created the National System of Interstate and Defense Highways and put more emphasis on roads and bridges in urban areas and secondary highways. Those roads were largely neglected by the highway commission during the 1930s. The Act also directed Montana Governor John Bonner, the highway department's former chief legal counsel, to create the Montana Highway Planning Committee (MHPC) to study the state's highway needs over the next decade.[25]

Composed of engineers, businessmen, and those employed in the agricultural and mineral industries, the committee published its findings in 1948. The report concluded that most of the bridges built by the highway department in the 1930s were outmoded by current traffic demands and would not be able to tolerate the loads placed on them by the modern commercial trucking industry. Prior to World War II, little discussion occurred regarding the industry in the highway commission meetings. By the late 1940s, however, bigger trucks and increased traffic caused by the post-war economy made the highway engineers take note of the damage the trucks caused Montana's roads and bridges. Although the federal government's make-work programs of the New Deal upgraded the state's road infrastructure, years of neglect during the war resulted in much of Montana's road system needing repairs and improvements. The report cited problems with bridges not built to post-war loading standards and that many were narrower than the roads leading to them, both posing serious safety hazards for motorists. Even before the committee presented its findings, the highway department embarked on a statewide program to improve bridges on both primary and secondary routes, mostly through widening existing structures.[26]

Postponed by the Montana Highway Department during the war, many of these early post-war projects also included the construction of large girder and steel stringer bridges over the Beaverhead, Bitterroot, Clearwater, Musselshell, and Madison rivers. The highway department oversaw the construction of five massive steel girder bridges over the Yellowstone River between 1949 and 1958, including the Huntley Bridge (24YL0656). Steel girders replaced trusses as the material of choice for river crossings in the late 1940s (they would be replaced by prestressed concrete in the early 1960s). Unlike the through trusses, girders were cheaper to construct and did not have the same overhead restrictions for commercial trucks. For shorter spans, the highway department continued to rely on timber bridges to cross smaller

[24] Steere, *History of the Montana Highway Department*, 103.

[25] Planning Survey Division, *Montana Highway History*, 3-4, 7.

[26] *Ibid*, 9, 46; *Montana State Highway Planning Survey, Preliminary Report on Highway Needs in Montana: Montana's Highway Problems*, (Helena: State Highway Commission, 1948), 11-12, 33, 38.

streams and drainages in eastern Montana. An overpass in Great Falls resurrected the railroad grade separation program in 1946. Unlike the WPGCH program of the 1930s, however, the federal government required the railroads to fund only ten percent of grade separation structures if it replaced an older overpass. The government funded the entire cost of the structure if it was a new grade separation.[27]

Many of the big bridges designed and built by the Montana Highway Department after World War II were located in proximity to the state's major urban centers to improve access from the surrounding rural areas and to improve trade networks between Montana's cities and towns. In 1948 and 1949, the commission let contracts to build new bridges near Butte, Missoula, and Billings. One of the most important of these projects was a new bridge across the Missouri River at Great Falls (24CA0401), which had a profound effect on the city, permanently altering its pattern of development by creating a new entrance to the city. Before 1951, the Second Avenue North Bridge provided the only access to Great Falls from west of the river. Tenth Avenue South at the time consisted of a scattering of warehouses, tourist cabin camps, auto repair shops, and working-class dwellings. Within a decade after the completion of the new bridge, Tenth Avenue South in the "Electric City" transformed into one the state's busiest thoroughfares, lined with stores, service stations, restaurants, and, by 1959, one Montana's first shopping malls. Where Tenth Avenue South once dead-ended at the Missouri River, it now provided access to two major highways and the expanding Malmstrom Air Force base.[28]

In June 1949, the highway commission let the contract for the bridge across the Missouri River at the west end of Tenth Avenue South, the "largest bridge and structural contract that this department has ever handled." The Anderson Construction Company of Great Falls underbid its competitors by $221,000 to build the combination steel girder and reinforced concrete structure. At over $1.7 million, it was also the most expensive bridge built by the highway department up to that time. The 2,093-foot bridge consists of six steel girder main spans and twenty-one steel stringer approach spans. The approaches rest on reinforced concrete hammerhead piers, the first of that design built in Montana. Instead of the standard ten-foot driving lanes, the bridge carried two fourteen-foot driving lanes over the river on a deck flanked by decorative concrete guardrails. Truly a Great Falls product, the Anderson Construction Company built the bridge and HGR Construction Company of the Electric City built the approach roads.[29]

The highway commission's new long-range plan to improve intra- and interstate travel and commerce manifested itself in the new Great Falls bridge, named the O. S. Warden Bridge in honor of Great Falls Tribune publisher and Good Roads activist Oliver S. Warden. Warden served as a member of the highway commission from 1924 to 1936. Dedication of the structure took place during the city's annual Fall Festival on September 15, 1951. Warden's widow, Eleanor, and son, Jock, cut the ribbon to the structure, opening up what would be one of the most important bridges built in Montana during the twentieth century. Great Falls Chamber of Commerce president Ray Welter called the bridge a "lasting monument to the loyalty and vision of community leaders with a burning desire to serve their fellow men." The bridge provided a new entrance to Great Falls off U.S. Highway 91 (and later Interstate 15) and facilitated the shipment of goods between eastern and western Montana via Montana Highway 200. The Warden Bridge symbolized the optimism and prosperity of the highway department's bridge programs after the war.[30]

Years of neglect and changes in vehicle weights had a serious impact on many older bridges in Montana during the early 1950s. The highway commissioners regularly received requests from communities to replace seriously deficient and, in some cases, dangerous bridges. To add to the problem, the commissioners often believed they were not responsible for bridges on primary roads built with county funds. The City of Forsyth approached the commission about replacing the Yellowstone River Bridge that carried U.S. Highway 12 traffic into the north side of that community. Instead of considering

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[27] Montana State Highway Commission meeting minutes, book 9, p. 165, Helena; Planning Survey Division, *Montana Highway History*, 5.

[28] Sanborn Fire Insurance Company Maps: Great Falls, Montana, 1929, 1950, 1957, MHS Research Center, Helena.

[29] Montana State Highway Commission Meeting Minutes, Book 9, pp. 398, 407, 409.

[30] Ibid, pp. 10, 274; "Bonner Cites Warden's Road Vision," *Great Falls Tribune* (15 September 1951); Montana State Highway Commission meeting minutes, book 10, pp. 309-310; "O.S. Warden Bridge Dedication Features Second Day of Fall Festival," *Great Falls Tribune* (14 September 1951).

the replacement of the bridge, which the commissioners declared was Rosebud County's responsibility, they contemplated limiting the maintenance of the road that led to it until the county replaced or repaired the old bridge.[31]

The Cold War played a significant role in deciding what bridges the highway commission funded during the 1950s. Bridge projects not located on the National System of Interstate and Defense Highway were not highly prioritized by the commissioners. The system replaced the War Department's old Priority One, Two and Three highways of the Second World War in 1944. Consequently, the highway commission was reluctant to assume many major bridge projects not on that system. The public's strong feelings about some deficient bridges and the highway commission's lack of enthusiasm in replacing them led the 34th Legislature to pass a law in March 1955 that provided direction to the highway commission. Intended to promote the construction of new bridges across the Yellowstone and Clark Fork rivers, Senate Bill 49 authorized the highway commission to allocate funds to pay "for the reconstruction of any major bridge or bridges on the State Highway Primary System." The legislators had four bridges specifically in mind when they crafted the law and considered each "dangerous, by their very nature, to the traveling public." Three crossed the Yellowstone River at Glendive, Forsyth, and Miles City. The fourth spanned the Clark Fork at Missoula. All were steel girder bridges. Between October 1955 and September 1956, the Department awarded contracts for the three Yellowstone River bridges. It later replaced the Clark Fork bridge at Missoula.[32]

None of the four bridges stipulated for replacement by the legislature were critical components of the National System of Interstate and Defense Highways, which occupied much of the highway commission's attention during the Fifties. Montana had 1,221 miles of highway on the system, including U.S. Highways 10, 91, and part of 87. The highway department's overall program remained steady, with 25 bridge projects let to contract each year. As in the 1930s, most were timber bridges. Unlike previous decades, though, a higher percentage of the projects were located on secondary farm-to-market roads. Created by the state highway commission at the direction of the Bureau of Public Roads in 1934, Montana's secondary highway system consisted primarily of old county roads that provided access to important agricultural and mining areas in the state. The creation of the system made the roads eligible for federal funds for upgrading and maintenance. The lack of federal funding for road and bridge projects during the war meant the highway department conducted no work on the system until increased federal funding became available after the war. The secondary highway system was critical to the state's economy, facilitating the transportation of agricultural and mining products to the primary highways and, thence, to the urban shipping centers. Most of the bridges on the system, however, were constructed by the counties and failed to meet the current federal standards. Beginning in 1946, the highway initiated a program to improve the secondary highways. Despite a steady program on both primary and secondary highways, by 1956, fully 94% of the state's bridges were deficient in some way; either they were too narrow for the approach roads or they failed to meet load standards.[33]

The crowning achievement of the Montana Highway Department's bridge program during the 1950s was a steel girder bridge across the Missouri River (24FR0804) between Malta and Lewistown. Grateful area residents later designated it the Fred Robinson Bridge for the man who worked so hard to get it built, the bridge was the most expensive and prominent structure built in Montana during the decade. The culmination of a four-decade effort by residents in Blaine, Fergus, and Phillips counties, it provided a river crossing that encouraged economic development of central Montana.[34]

State Senator Fred Robinson spearheaded a bill through the 1953 Legislature that authorized the creation of a Toll Bridge Authority to sell bonds "and to take other action necessary to construct, maintain, and operate toll bridges" in Montana. The law was designed specifically to construct a bridge across the Missouri River between Malta and Lewistown. Within a year, however, the highway commissioners learned that the bridge could be financed through the regular process without

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[31] Montana State Highway Commission meeting minutes, book 10, p. 76; ibid, book 12, pp. 38, 195.

[32] Planning Survey Division, *Montana Highway History*, 2-4, 8.

[33] Steere, History of the Montana State Highway Department, 31.

[34] A Missouri River bridge between Malta and Lewistown was a regular discussion topic in Montana State Highway Commission meetings beginning in the early 1920s until the commissioners let the contract to the N. A. Nelson Construction Company to build the bridge. There are too many citations to list here.

the need for making it a toll facility. Indeed, because the site of the proposed bridge was located on federally owned land within the Charles M. Russell National Wildlife Refuge, the government would pay the full cost.[35]

On 26 July 1955, the State Highway Commission finally advertised for bids to construct the bridge. Unfortunately, all bids came in over the engineer's estimate. Consequently, the Commission held off re-advertising the contract until it made modifications in the design of the structure. On 25 October 1956, the Wyoming-based N. A. Nelson Construction Company's low bid of $718,051.25 won them the contract. The Paper, Calmenson & Company of St. Paul, Minnesota, obtained the contract to provide 73 tons of reinforcing steel for the concrete piers, while the American Bridge Company of Gary, Indiana, would supply the 475 tons of structural steel. Caird Engineering of Helena submitted the low bid for the steel guardrails. The Nelson Company purchased the cement for the bridge from the Ideal Cement Company of Trident. It obtained the aggregate from a commercial gravel pit near Lewistown.[36]

The construction of the bridge proved a logistical nightmare for the contractor. The construction site was located thirty-one miles from the nearest railroad terminal at Roy. The building material had to be trucked in from the Milwaukee Road Railroad station at Roy over a road that was "mostly a trail of the worst kind of gumbo imaginable." The materials could only be hauled in during periods of dry weather. Nelson established a twelve-unit trailer camp at the bridge site (at the current site of the Bureau of Land Management's recreational facility). To accommodate the workers, the company drilled a well, laid water and sewer pipes, and built a small electric light plant. Despite the amenities, the contractor's superintendent, Earl Rook, later stated that he "had more trouble keeping experienced men on the job than on any job he [had] ever built."[37]

The structural steel did not arrive in the railhead at Roy until June 3, 1958 – a delay of nearly six months. Because the roads were nearly impassable, the contractor could not begin trucking the steel to the construction site until June 27. In order to meet the contract deadline, the Nelson Company expanded its work schedule to 9-hour days, six or seven days a week. The company completed the superstructure and had just begun painting the bridge when a second shut down order was issued on November 22, 1958. Named for the state senator who championed the project for over two decades, the Fred Robinson Bridge finally opened for traffic in March 1959. It was the last major steel girder bridge constructed in Montana before the Interstate highway program took priority.[38]

Aesthetics gave way to speed and convenience, which in an ironic way was the intention of the very first Montana bridge builders. Bridges built during the late 1940s and 1950s were devoid of the visual appeal represented in many of the bridges of the pre-war years. They were simple, utilitarian, and functional. They could accommodate the demands placed on them by the commercial truckers, the military during the Cold War, and by tourists. They were, sadly, not much to look at, but they served their purpose. They became uninteresting and largely unnoticed extensions of the road, precursors of the regimentation of the Interstate highway era of the next decade. What the bridges lacked in individual distinction, however, they more than made up for in their practicality. Post-war Montana bridges served the purpose and intent of the federal and state governments to provide motorists with a dependable structure that could more than accommodate the traffic placed on them.

Glossary

[35] *Laws, Resolutions, and Memorials of the State of Montana Passed by Thirty-Third (1953) Assembly in Regular Session*, (Helena: State Publishing Co., 1953), 52-63; Montana Highway Commission Meeting Minutes, Book 13, 70 (29 November 1954).

[36] Ibid, Book 13, 170-171 (26 July 1955); Ibid, Book 13, 422-423 (25 October 1956); Bridge Construction File No. F-FLH 333(13), Montana Department of Highways Bridge Bureau Records, Montana Historical Society, Helena; "Bridging the Missouri Saves Miles," *Western Construction*, (April 1958), 56, 59.

[37] "Bridging the Missouri Saves Miles," 56, 59; Bridge Construction File.

[38] Ibid.

Abutment: A concrete or wood structure used to support the ends of bridges and to transfer traffic off the deck of the bridge.

Beam: A generic term for a variety of horizontal structural components. Beams can be constructed of wood, metal, concrete, or combinations of these materials. They may be solid, flat, I-shaped, T-shaped, latticed, or boxed.

Deck: The horizontal surface that stretches from abutment to abutment of a bridge. Traffic and utility loads are placed on the deck. In modern bridges, most decks are concrete. The deck also provides stiffness for the bridge by connecting support beams and trusses.

Girder: A main support member for the structure that usually receives loads from floor beams and stringers; also, any large beam, especially if built up.

Guard Rails: Metal, concrete or wood panels on the side of bridges that serve to prevent traffic from leaving the bridge mid-span.

Guard Walls: Metal, concrete, or wood walls along the sides of bridges to prevent traffic from leaving the bridge mid-span. Closed balustrade guard walls present a solid wall surface, though many have surface decoration in the form of grooves or geometric patterns.

Jersey-barriers: A type of modern closed-balustrade guard wall designed to deflect traffic back onto the roadway. These barriers are either permanent or can be installed in removable modules.

Pier: A mid-span bridge support. Piers transfer bridge loads from the spans to the ground. Piers can be either solid walls or multiple columns. Piers can be constructed of a variety of materials including concrete, metal or wood.

Pier Cap: A transverse member connecting the top of pier columns or the top of a wall pier. In beam bridges it supports the stringers of the bridge.

Piling: A metal or wood pole that is driven into relatively soft sediments to provide support for bridges, either mid-span or in the abutments.

Piling cap. A transverse member connecting a linear series of pilings. In addition to providing a support for bridge stringers, the cap also compensates for any irregularities in the tops of the piling produced by the driving of the pilings.

Stringers: A series of parallel beams supporting the deck of a bridge. These beams run lengthwise to the bridge and are supported by abutments and / or center supports. The terms "Stringer", "Beam" and "Girder" are often used interchangeably in the literature. However, stringers usually directly support the deck while girders are often employed transversely to support or connect the stringers. Both are composed of beams.

F. ASSOCIATED PROPERTY TYPES

A. Introduction: Bridges and the National Register Evaluation Criteria[39]

This documentation form examines steel stringer and steel girder bridges constructed in Montana from 1901 to 1961. According to National Register Bulletin No. 15, "How to Apply the National Register Criteria for Evaluation," to be eligible for listing in the National Register of Historic Places, a bridge must be significant in state, local or national history, architecture, engineering or culture, and possess integrity of location, setting, design, material, workmanship, feeling, and association. In addition, the bridge must meet one or more of the four National Register Criteria:

A. be associated with events that have made a significant contribution to the broad patterns of our history; or

B. be associated with the lives of persons significant in our past;

C. embody the distinctive characteristics of a type, period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. have yielded, or may be likely to yield, information important in prehistory or history.

The specific means by which a bridge may meet each of the National Register Criteria are discussed below.

National Register Criterion A: Under Criterion A, an historic steel stringer or steel girder bridge may be eligible for the National Register through its association with historic themes. Applicable areas of significance for bridges as defined in National Register Bulletin No. 16 include:

- Exploration/Settlement: Bridges, especially early bridges, may have been associated in a meaningful way with the settlement or development of a geographically definable area. Larger bridges over major rivers may have significance for their historical associations with regional settlement or development.

- Industry: The design of bridges is closely associated with the technology and process of producing new materials. Bridges associated with the development and introduction of new materials are important.

- Politics/Government: The construction of bridges has most often been undertaken by governmental bodies – first townships, then counties, and later the state with federal regulations and financial inducements. Bridges may be significant if they represent important patterns in the methods counties awarded contracts or are associated with standardized state designs. Although the Montana State Highway Commission began providing bridges plans to the counties in 1915, it was not until 1926 that all bridge engineering work was assumed by the state. Other important bridges may be associated with federal emergency relief and New Deal programs, such as the Works Progress Administration, intended to create labor intensive jobs during the Great Depression.

- Transportation: Every historic steel stringer or steel girder bridge in Montana found eligible for the listing in the National Register of Historic Places is associated with the "broad pattern" of transportation. Bridges may gain additional significance under this theme if they facilitated major passage to or through a region or played an important role in the development of an effective transportation system. Large bridges, especially the costly steel girder structures, represent major investments on the part of counties to address the public's demand for adequate transportation routes.

[39] This section of the MPD is adapted from "Historic Highway Bridges of North Dakota" (February 1997). The document was prepared for the North Dakota State Historic Preservation Office by Mark Hufstetler of Renewable Technologies, Inc. of Butte, Montana.

National Register Criterion B: Under Criterion B, an historic steel stringer or steel girder bridge may be eligible for the National Register if a historically significant person's importance relates directly to the structure. Since the National Register's guidelines state that properties significant as an important example of an engineer's skill should be nominated under Criterion C, it is rare that a bridge would be found eligible under Criterion B. Because all historic bridges in Montana were constructed from standardized designs or from designs purchased from catalogues, no known bridge in the state is eligible for the National Register under Criterion B.

National Register Criterion C: Under Criterion C, an historic steel stringer or steel girder bridge may be eligible for the National Register if it embodies "the distinctive characteristics or a type, period, or method of construction, or represents the work of a master, possesses high artistic value, or represents a significant and distinguishable entity whose components may lack individual distinction." The only applicable area of significance for bridges under this criterion from Bulletin 16 is in the category of engineering.

The design and popular use of bridge types is closely tied to the development of new materials and an understanding of their use. Bridges can provide excellent illustrations of the changes that occurred in metal and concrete technologies. Some bridges may be significant as rare examples of a type, either as design experiments or widely accepted types that are no longer common. Other bridges, by their ubiquity, are significant as representative examples of a commonly used type and method of construction. Engineers also added aesthetic details, such as decorative balustrades, to some bridges which increase their significance beyond the pure mathematical application of the science.

National Register Criterion D: Under Criterion D, an historic steel stringer or steel girder bridge or its remains may be eligible for the National Register if it can yield important information about bridge technology or construction. The information should be embodied in the bridge or its remains; the mere existence, or former existence of a bridge at a particular location does not constitute sufficient important information. Furthermore, the information should not be available through other sources, such as historical documents or extant bridges. Prior inventories of Montana highway bridges have failed to identify any properties that meet this criterion.

B. Property Types

I. Name of Property Type: Steel Stringer and Girder Highway Bridges

II. Description:

This property type includes those bridges that use steel beams to span an opening or other obstruction. The beams may span between the abutments and piers or be anchored to the abutment and cantilevered over a pier. The beams are either I-beams or built-up of steel plates and angle iron sections. In its simplest form, the I-beams and girders are spaced close together to carry the deck.

The I-beam represents the structural steel shape most common today. The shape (two equal and flat flanges) was first employed in building construction prior to the Civil War. It was not until the turn of the twentieth century that steel I-beams gained general acceptance in bridge construction, primarily in short-span applications where timber stringers were formerly used. Through the 1910s, the relatively small I-beam sections available generally limited the use of steel stringer bridges to 40 feet. In Montana they were used primarily by the counties on farm-to-market roads. As steel mills increased the depth of the I-beam through the 1920s, the maximum span of I-beam bridges also increased the reach to 80 feet by 1928 (although 60-foot spans were considered the most efficient). One of the most common uses of steel stringer bridges during the 1930s was to create grade separation structures between highways and railroads.[40]

[40] Milo S. Ketchum, *Structural Engineers' Handbook*, (New York: McGraw-Hill, 1914), 118; Josef Sorkin, "Design of Highway I-Beam Bridges; Simple, Continuous and Cantilever Spans," Civil Engineering Thesis, University of Nebraska, 1936.

During the 1910s, engineers recommended steel girder bridges be used in urban areas to support heavier loads; steel truss bridges remained more economical at the time for country roads. Through the 1920s, steel girder bridges gradually gained acceptance over truss bridges, the main advantage being the protection of the structural members from errant vehicles. Limitations in field riveting capabilities and the maximum lengths of beams railroads could carry generally limited spans to about 100 feet until the 1930s.[41]

During the 1930s, I-beams and girders saw greater use by the Montana Highway Department because of improvements in materials and fabrication methods. Increasingly during the Great Depression, steel stringer and girder bridges supplanted steel truss bridges as the bridge type of choice for major river crossings and for railroad grade separation structures. Steel stringer and girder bridges weren't limited by height and width restrictions standard to truss bridges. They also best fulfilled the department's policy of designing aesthetically pleasing structures that melded into the landscape rather than stand in stark contrast to it as did the truss bridges. Despite that, the highway department continued to build steel through truss bridges at wide river crossings until 1946. Thereafter, however, the department relied totally on steel stringer and girder bridges for all river crossings and grade separation structures.

III. Significance

Within the general guidelines for significance of Montana steel stringer and steel girder highway bridges established in the introduction to the property types section, the following steel stringer and steel girder bridge specific information is added:

Criterion A: Both in-state and out-of-state fabricators and contractors are important to the history of Montana bridge building for introducing steel bridge technologies. For steel stringer and steel girder bridges, however, those fabricators and contractors had little impact before 1915. In Montana, simple steel stringer bridges were built by county work crews on farm-to-market roads, for example the Locate Creek Bridge (24CR0761). The first large steel girder bridge built by a contractor under the auspices of the Montana Highway Department was constructed in 1919 across Otter Creek in Powder River County (the bridge is no longer extant). Although smaller, local and out-of-state companies also successfully competed for Montana bridge contracts, especially after 1915 when the state began overseeing the advertising and bidding process for the counties, steel stringer bridges usually cost less than $500 and did not fall under the purview of the state.

Because of the low cost of the bridges and because they were often built by county crews, few references occur in Montana county records. Instead, one must rely on empirical methods to gain a general (and incomplete) estimate about the number of steel stringer bridges built in the counties before 1915. In this case, that evidence is provided in the Montana Department of Transportation's (MDT) on- and off-system bridge inventories. Evidence suggests that the counties built at least 61steel stringer and girder bridges before 1926. The number, however, is likely much higher because only those bridges currently being inspected by the MDT are on the list and the agency does not inspect all county-owned bridges.

In 1915, the Montana State Highway Commission's bridge department standardized the design of steel stringer bridges. It also oversaw the advertising and bidding process for individual bridges that cost more than $500 on county-maintained roads and all bridges located on the Federal Aid highway system. The state usually let groups of steel stringer bridges to contract in conjunction with road improvement projects on those same segments of highways. Steel girder bridges, because of their greater size and complexity, were let to contract as individual projects. That pattern of bridge construction applied to all bridges built by the Commission and the Montana Highway Department (after 1919).

Steel stringer grade separation bridges constructed in Montana after the passage of the Hayden-Cartwright Act in 1934 are significant for their association with a national program to eliminate dangerous at-grade railroad crossings on primary highways and replace them with grade separation structures. The program, supported by the Works Progress Grade

[41] Ketchum, *Structural Engineers' Handbook*, 118; Carl W. Condit, *American Building*, (Chicago: The University of Chicago Press, 1982), 257; Wilson G. Harger and Edmund Bonney, *Handbook for Highway Engineers* I (New York: McGraw-Hill, 1927), 209.

Crossing Program (1935-1936) and the Federal Aid Grade Crossing Program (1937-1941), built thirty reinforced concrete and steel stringer grade separation structures throughout Montana. Of those, half were steel stringer or steel girder structures. Overhead grade separations in Montana are often quite visually impressive requiring the carrying of the road up to a specified height above the railroad tracks. The Mossmain Overpass (24YL0698) is a good representative example of the type of structure built under the federal programs. Consequently, these structures include massive earthen approach berms that make them visible from great distances, especially in eastern Montana. Beginning in 1936, moreover, highway department bridge engineers strove to make all bridges it designed more aesthetically pleasing. While through and pony truss designs were static and not subject to much deviation, steel stringer and girder bridges could be fabricated to provide a more visually appealing form that was much less obtrusive on the landscape. The Mossmain Overpass (24YL0698) best fits the highway department's policy of designing bridges that were functional and also visually appealing. Not all grade separation structures were overpasses. The highway department also built eleven highway underpasses under the auspices of the Hayden-Cartwright Act in cities throughout Montana between 1934 and 1941, with the Orange Street Underpass (24MO0361) serving as a good example. These structures all included decorative portals and arcaded walkways.

Criterion C: Although metal truss and concrete bridges attract the greatest attention in historic bridge surveys because of their visual prominence, the vast majority of bridges in the United States are short span steel stringer and girder bridges. The great number and unobtrusive similarity of bridges in this property type make it difficult to identify bridges with special engineering significance. Evolution in design is limited mainly to the increased length of allowable spans in more recent years. Nevertheless, their use is associated with the important historical changes in industrial capacity which allowed the production of needed structural shapes and in their acceptance, exemplified by the Marias River Bridge (24TL0401), as a replacement for metal truss bridges.

Because of the large number of bridges in this property type and the lack of detailed construction documentation, representative examples must be selected. National Register *Bulletin 15* states that a "structure is eligible as a specimen of its type or period of construction if it is an important example (within its context) of building practices of a particular time in history." In selecting representative examples of steel stringer and steel girder bridges, evaluation should weigh additional characteristics, such as being the oldest example, the longest span, or exhibiting decorative details not found on similar bridges. The oldest surviving bridges show the earliest extant use of the technology; the longest spans reflect maximum limits of the technology. Decorative details are important expressions of aesthetic ideals and design concepts.

IV. Registration Requirements

The period of significance for this property type is from 1901 (the construction date of the first known steel stringer bridge built in Montana) to 1962.

National Register Criterion A: A steel stringer or girder bridge in Montana may be eligible for listing in the National Register of Historic Places under Criterion A if it was or is:

1. Associated with county-sponsored and funded infrastructure improvement programs during periods of expansion or consolidation. Montana's economy throughout its history has been characterized by recurring boom and bust cycles. During periods of prosperity in the state (i.e. 1881-1893 and 1909-1918), counties endeavored to provide good roads and bridges for its constituency. Although many bridges built by the counties during these periods were Pratt pony and through trusses, many more were simple steel stringer bridges that spanned coulees, small streams, and ravines. They were inexpensive to build, didn't require bond elections or a lengthy contract process, and could be built by county forces. Even after the Montana State Highway Commission stepped into the process in 1915, the pattern for steel stringer bridges established by the counties did not significantly change. The highway commission's oversight applied only to bridges that cost more than $500 to construct – the majority of the county-built steel stringer bridges cost less than that amount. Even

as the cost of steel stringer bridges inflated after World War I, the state still assumed no appreciable role in the counties construction of steel stringer bridges.[42]

2. Associated with the Montana Highway Commission/Montana Highway Department's Initial Phase of Road and Bridge Improvements From 1915 to 1941. The Montana State Highway Commission's bridge department standardized a design for a simple steel stringer bridge in 1915. That simple design was utilized by the department for crossings under 40 feet, while crossings greater than 40 feet utilized steel truss spans. The basic design of steel stringer bridges remained unchanged until the onset of the Great Depression in 1930. The only variation in design was in the type of guardwalls or guardrails that flanked the deck. In this respect, motorists would not be able to differentiate between a reinforced concrete or a steel stringer bridge from the vantage point of the road. Groups of steel stringer bridges, like timber structures, were let in groups in conjunction with road improvement projects. Steel girder bridges, on the other hand, were less common than steel stringer bridges during this period. Steel girder bridges were designed to span wider crossings than steel stringer structures, but the Montana Highway Department commonly used steel truss bridges in those instances. Consequently, there are only 22 steel girder bridges dating from 1934 to 1941, while there are 37 steel stringer structures that date to that time.

3. Grade Separation Structures Constructed After the Passage of the Hayden-Cartwright Act of 1934. These bridges and underpasses are significant representations of the federal government's attempt to address the national problem of vehicular accidents at points where highways crossed railroad lines. A documented date of construction is required as is the Montana Highway Department's assigned project number.

4. Built under the Auspices of Hoover Administration or New Deal Programs. These bridges have important associations with the federally sponsored, labor-intensive work programs and sometimes display aesthetic details such as stone abutments and decorative balustrades not typical of steel stringer or steel girder bridge construction.

5. Associated with the Montana Highway Department's Post-World War II Building-Boom. Beginning in 1946, the highway department dispensed with expensive pony and through truss structures on the state's primary, secondary, and urban routes and began replacing those structures with long-span steel stringer and steel girder structures. That transition reflects a change in traffic demands for Montana's bridges after World War II as increasing commercial and passenger traffic rendered truss bridges functionally obsolete because of their height and width restrictions. The highway department began funding long-span bridges that were more expensive than truss bridges, but were more utilitarian for users. Steel girder bridges began to appear more frequently on Montana's highways either at new sites or through the replacement of older truss bridges. These bridges, moreover, were less obtrusive on the landscape, and were devoid of any ornamentation.

National Register Criterion C: A steel stringer or steel girder bridge in Montana may be eligible for listing in the National Register under Criterion C if it was or is:

1. A Design of Aesthetic Merit. Most of Montana's steel stringer and steel girder bridges feature basic designs within angle section or highway guardrails, and concrete or timber abutments. Variations from this standard design, such as balustrade railings or cambered girders, are significant for possessing aesthetic ideals or design concepts more fully than typical steel stringer bridges.

2. Any Steel Stringer or Steel Girder Bridge Which Exhibits Unusual Engineering Design. Variations on the basic design of steel stringer and steel girder bridges are unusual in Montana, but there are a few bridges that display unusual design features that merit consideration for National Register eligibility.

3. Any County-Built Steel Stringer or Steel Girder Bridge with a Documented Date of Construction and/or Builder. In comparison with truss and reinforced concrete bridges, most steel stringer and steel girder bridges are smaller and less

[42] George R. Metlen, *Report of the Montana State Highway Commission for the Years 1915-1916*, (Helena: State Highway Commission, 1916), 5-6.

conspicuous on the landscape. For this reason, they seldom display a dedication plaque or other construction information. Similarly, their small size makes their construction less likely to be recorded in historic documents. Steel stringer and steel girder bridges whose construction history is known are quite uncommon; those with such information are significant in documenting the historical and engineering lineage and chronology of steel stringer and girder design and construction in Montana.

4. The longest steel stringer or steel girder bridges in Montana. Since the evolution of the design of this type of bridge is limited mainly to length, the longest examples have statewide significance.

5. The Oldest Document Bridge of a Type in Montana. The first known steel stringer or steel girder bridge or the first of a particular design modification have local and statewide significance.

6. Bridges where all of the structural components (other than the decking) is original to the structure. Like most man-made structures, modifications are made to bridges as the demands placed on them change. Substructures can be altered to handle heavier loads, additional structural components added, and new guardrails replace original railings. Finally, bridges still at their original locations would have more integrity than those relocated – even during the historic period.

V. Integrity

In addition to the requirement that a bridge must meet one of more of the National Register criteria to be considered eligible for listing in the National Register, it must also retain integrity. The integrity of each bridge is assessed through the following aspects:

Design, Materials, and Workmanship: Because steel stringer and steel girder bridges are of such simple design it must still be able to convey its design features. A steel stringer and steel girder bridge retains integrity of design, materials, and workmanship if the structure retains materials original to the construction, replacement materials were installed during the period of historic significance, or modern repairs or replacements are the same type as those used during the period of significance. Often, however, the MDT has replaced the original guardrails on steel stringer and girder bridges with concrete "Jersey" rails if the structure is on a route with significantly high traffic demands. The original railings have been removed from the Fred Robinson Bridge (24FR0804) and the Mossmain Overpass (24YL0698). However, the aesthetics of the design and the structures' significance to the development of the local transportation systems transcends the loss of the guardrails. Significant materials include the stringers and girders, floor systems, substructure, and the abutments. The original deck and guardrails are not necessary for the bridge to be eligible.

Setting and Location: These two aspects have equal effect on overall integrity. Integrity of design, materials and workmanship has a direct bearing on the integrity of setting and location. Steel stringer and steel girder bridges must be in the location where they were constructed. Physical and visual intrusions can diminish the integrity of setting and location, but do not in themselves, preclude eligibility unless the relationship of the bridge to the topographic feature which resulted in its construction has been destroyed.

Feeling and Association: These two aspects have equal effect on overall integrity. The integrity of design, materials, and workmanship also has a direct bearing on the integrity of feeling and association. Integrity of feeling and association of a bridge will be lost if modern materials cover the historic materials or are of such a scale and contrast to the remaining historic materials that the observer is more impressed by the alterations than the historic resource.

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Name of Property Montana
County and State Montana's Historic Steel Bridges, 1901-1961
Name of multiple listing (if applicable)

Section number G & H Page 1

G. GEOGRAPHICAL DATA

This nomination applies to properties located within the present boundaries of the State of Montana.

H. SUMMARY OF IDENTIFICATION AND EVALUATION METHODS

This Multiple Properties Nomination is a product of a distinct research and field survey project: a statewide field inventory and context development for Montana's steel stringer and steel girder highway bridges conducted between 1998 and 2000. Two published works, *Historic Bridges in Montana* (Quivik 1982) and *Conveniences Sorely Needed: Montana's Historic Highway Bridges, 1860-1956* (Axline 2005) were produced that deal with Montana's bridges. The field surveys and historic context culminated in the preparation of this document and eight individual National Register nominations.

1. Initial field survey and context development (1980-1985)

Montana conducted one of the first state-sponsored historic bridge inventories in the United States beginning in 1979. In addition to recording steel truss, reinforced concrete, and steel girder bridges, the survey also included railroad bridges not under county or state jurisdiction. The field survey along with the background research provided the basis for additional historic bridge surveys conducted by the Montana Department of Transportation (MDT) in 1986 (treated timber bridges), 1999 (reinforced concrete bridges), and 2000 (truss bridges built between 1935 and 1946). Renewable Technologies, Inc. (RTI) of Butte, Montana conducted the 1979-1980 inventory under contract to the MDT. Frederic Quivik and Gray Fitzsimons conducted the survey; Jet Lowe provided photographs of the bridges. The intensive field survey inventoried 477 historic highway and railroad bridges in the state, and also completed substantial primary and secondary research related to the history of Montana's bridges. That survey provided the basis for subsequent historic bridge surveys conducted in Montana. Primary research included construction files and plans at the MDT for on-system bridges. For off-system structures, RTI conducted city hall and county courthouse research, specifically in county commissioner and city council meeting minutes and road books. Secondary research included county histories, J.A.L. Waddell's *Bridge Engineering* (John Wiley & Sons 1916) and Milo Ketchum's *The Design of Highway Bridges* (McGraw-Hill 1912).

The MDT also initiated a bridge inspection program in 1979. The inspections included both on-system bridges administered by the MDT and off-system bridges under the jurisdiction of cities and counties. Because of this inspection program, the MDT provided RTI with a list of bridges built before 1930 and their locations. The resulting field survey conducted by RTI included only those structures inspected by the MDT. In 1982, the MDT and the National Park Service published Quivik's *Historic Bridges in Montana*, a seminal work among the first publications in the United States to address historic bridges. The book provided the basis for additional Montana bridge surveys and for this document. It was not until 1985, however, that the MDT submitted a Determination of National Register Eligibility for historic bridges to the Montana State Historic Preservation Office (SHPO). The SHPO concurred in the determination that 77 bridges were eligible for the National Register and that 400 bridges were ineligible for the National Register. The criteria outlined in Section "F" above provided the basis for that first determination of eligibility for historic bridges in 1985.

2. Montana Department of Transportation's Historic Roads and Bridges Programmatic Agreement (1989)

RTI's historic bridge survey and the 1985 determinations of eligibility provided the basis for the MDT's management of historic bridges for the next twelve years. In 1989, the Montana SHPO, Federal Highway Administration (FHWA), Advisory Council on Historic Preservation (ACHP), and the MDT implemented a programmatic agreement (PA) concerning historic roads and bridges. The PA, the first of its kind in the United States, abrogated the MDT's requirement to further inventory and evaluate historic roads and bridges within the state. Instead, it required the department to complete narrative and technical histories of road and bridge development in the state. Consequently, the MDT produced *Roads to Romance: The Origins and Development of the Road and Trail System in Montana* (Wyss 1992) and *Monuments Above the Water: Montana's Historic Highway Bridges* (Axline 1993). The agreement also specified that the MDT develop educational programs and an Adopt-A-Bridge Program. The PA remained in effect until supplanted by revised and expanded agreements in 1997 and 2007.

3. 2000 Field Review

In 2000, the MDT initiated a survey of historic steel stringer and steel girder bridges. This survey, conducted by MDT Historian Jon Axline, included all steel stringer and steel girder bridges built by the MDT and the counties between 1901 and 1961. The MDT has not treated steel stringer and girder bridges thematically, but, instead, made determinations of eligibility on a case-by-case basis per the terms of the revised 1997 PA.

4. 2007 Programmatic Agreement and publication of *Conveniences Sorely Needed: Montana's Historic Highway Bridges, 1860-1956*.

In 2007, the Montana SHPO, FHWA, ACHP, and the MDT implemented a new PA that better addressed the current management of the state's remaining historic bridges. The document contains provisions for the development of an historic bridge database, the implementation of an historic bridge rehabilitation program, and the development of Multiple Properties Documents for steel stringer and girder, steel truss, reinforced concrete, and timber structures. The Adopt-A-Bridge Program was also carried forward in the 2007 PA, including amendments and provisions to better handle historic bridges that could not feasibly be relocated, such as reinforced concrete and substantial steel stringer and steel girder structures. The earlier amendments stipulated the MDT and Montana Historical Society would cooperate in the production and publication of a new book on Montana's historic highway bridges. The new book, built on the groundwork laid by RTI and Frederic Quivik (1982), included additional research in both primary and secondary sources by the author, Jon Axline. The book provides an historic context for Montana bridges built between 1860 and 1956. Historic steel stringer and girder bridges built between 1901 and 1959 are included in the book and the historic context in the book provided the context statement for this MPD. The book, *Conveniences Sorely Needed: Montana's Historic Highway Bridges, 1860-1956*, was published by the Montana Historical Society Press in 2005.

5. National Register of Historic Places nominations (2009-2012)

Stipulation 4(C) of the 2007 Programmatic Agreement states that the MDT will "develop National Register Multiple Property Documents (MPD's) for steel stringer and girder, steel truss, reinforced concrete, and timber bridges in Montana." To complete that stipulation, the MDT evaluated on- and off-system steel stringer and girder vehicular bridges in Montana for inclusion in a MPD in 2009. Consequently, eight bridges suitable for individual National Register nominations as part of an MPD submittal were developed by the MDT. All eight bridges meet the criteria described above and have not been programmed by the MDT or nominated by the counties for replacement. Six of the eight bridges are owned by the MDT and two are off-system and county-owned. Each of these bridges have been photographed. Additional research in primary and secondary sources about each structure was completed and included in the National Register nomination forms.

Using the 2000 research materials, supplemented by additional research conducted between 2001 and 2010, MDT Historian Jon Axline prepared this Multiple Properties form and the individual nomination forms during the autumn of 2009 and summer of 2010. All products were originally submitted to the Montana SHPO in 2010.

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Name of Property Montana
County and State Montana's Historic Steel Bridges, 1901-1961
Name of multiple listing (if applicable)

Section number I Page 1

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