

STONE BRIDGE
(Bridge 7614)
Grand Portage National Monument
CSAH 17 spanning Grand Portage Creek
Grand Portage
Cook County
Minnesota

HAER MN-126
HAER MN-126

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

STONE BRIDGE (Bridge 7614)

HAER No. MN-126

- Location:** CSAH 17 spanning Grand Portage Creek, Grand Portage National Monument, Grand Portage, Cook County, Minnesota
- The Stone Bridge is located at latitude: 47.963590, longitude: -89.683631. The point represents the approximate center of the bridge and was obtained using Google Earth (WGS 84) on February 5, 2016. There is no restriction on its release to the public.
- Present Owner:** Grand Portage National Monument, National Park Service
- Present Use:** Transportation
- Significance:** The Stone Bridge is significant for its association with the Civilian Conservation Corps-Indian Division (CCC-ID). Minnesota Chippewa enrolled in CCC-ID camps throughout the state, including the one at Grand Portage, which was established in 1936. Grand Portage camp enrollees participated in numerous projects, including the construction of this span. Although the CCC-ID seem to have generally constructed timber stringer spans, this one was built with ARMCO multi-plate arches and native stone to create a rustic structure based on examples from the National Park Service's 1935 *Park Structures and Facilities* design book. The bridge's location on the route accessing the Grand Portage band's community facilities has made it an important community landmark since its completion in 1938. In addition, this may be the only CCC-ID-built bridge remaining in the state of Minnesota.
- Historian:** Justine Christianson, HAER Historian, 2015-2016
- Project Information:** The Stone Bridge Recording Project was completed in 2015-2016 by the Historic American Engineering Record, Heritage Documentation Programs, a division of the National Park Service, under the direction of Richard O'Connor, Chief. Grand Portage National Monument, Timothy Cochrane, Superintendent, and the Grand Portage Band sponsored the project. Christopher Marston, HAER Architect, served as Project Leader. The field team consisted of Jeremy Mauro and John Wachtel, HAER Architects, and Jocelyn Belmonte, Montgomery College. Jeremy Mauro produced the large-format photographs, and Justine Christianson, HAER Historian, wrote the historical report. Ashley Brown, who is writing a

National Register nomination on the bridge, provided research notes from the National Archives and Records Administration-Kansas City. Mary Ann Gagnon from the Grand Portage Band provided photographs. Stephen Veit and Brandon Seitz, Grand Portage National Monument, assisted the field team.

For photographs of Grand Portage National Monument, see HABS MN-76, Grand Portage National Monument, Buildings Complex.

Part I. Historical Information

A. Physical History:

1. Date of construction: 1938

2. Engineer: None

3. Builder/Contractor/Supplier: Civilian Conservation Corps-Indian Division (CCC-ID) enrollees in the Grand Portage Camp constructed the bridge under the supervision of Leo Smith, camp foreman. The enrollees obtained the stone from local quarries.¹

Armco Drainage Products Association (ARMCO) supplied the multi-plate arches used in the bridge's construction. John B. Tytus of ARMCO developed the first continuous rolling mill at the company's Ashland, Kentucky, plant in 1924, which "revolutionized the art of steel making and opened the door to the mass-production of consumer goods fabricated from steel." By 1930, ARMCO operated plants in Middletown, Hamilton, and Zanesville, Ohio; Butler, Pennsylvania; and Ashland, Kentucky. The company had also acquired the Sheffield Steel Corporation, with plants in Kansas City, Missouri; Tulsa, Oklahoma; and Houston, Texas. In the late 1940s, they took over the Rustless Iron & Steel Company of Baltimore, resulting in creation of a new division called Advanced Materials Group, which produced alloys and titanium used in the aerospace and nuclear industries. By 1951, the company was incorporated as Armco Drainage & Metal Products.²

4. Original plans and construction: The original plans for the bridge have not been discovered, but it is possible the CCC-ID planned to erect a timber stringer bridge like those built elsewhere in Minnesota. A December 1937 letter to the Commissioner of Indian Affairs indicated the bridge specifications were "materially changed since this project was presented, in

¹ William W. Halsey, Assistant Forest Engineer, to William Heritage, Production Coordinator, November 29, 1937, in Box 433, Record Group 75: Records of the Bureau of Indian Affairs, National Archives and Records Administration-Kansas City [hereafter cited as RG75, NARA-KC].

² C. William Verity, Jr., *Faith in Men: The Story of Armco Steel Corporation* (New York: The Newcomen Society in North America, 1971), 18-21, quote from page 18; "Out of an Idea—An Industry: The History of Armco Drainage & Metal Products, Inc., 1896-1959" (Middletown, OH: Armco Drainage & Metal Products, Inc., 1961), 34.

order to have the construction in line with the other improvements contemplated for Grand Portage, and so that the design would meet with the approval of the Indian Office.”³ This change was in response to a September 1937 memo penned by William Zimmerman, Jr. of the Indian Office, who found the proposed bridge design “not bad” but wanted to see one more like those found on page 50 of *Park Structures and Facilities*, a 1935 National Park Service publication highlighting park structures whose designs successfully complemented the landscape in which they were located (see Figure 1, Appendix A).⁴ The referenced page had five photographs of stone arch bridges located in Canyon Park, Oklahoma City, Oklahoma; Wintersmith Metropolitan Park, Ada, Oklahoma; McCormick’s Creek State Park, Indiana; and Buttermilk Falls State Park and Taughannock Falls State Park, both in New York. Another letter included an example of a span with an ARMCO multi-plate arch clad in stone in Minnesota’s Camden State Park.⁵ The stated reason for this design change is not known but it may have been due to the bridge’s proximity to the former North West Company fur trading post and the Grand Portage trail, where the Minnesota Historical Society was focusing its efforts on preserving and interpreting the history of the fur trade.

The bridge was constructed of prefabricated multi-plate arches supplied by ARMCO. Presumably the enrollees erected the multi-plate arch according to ARMCO’s recommended practices, but no discussion of that phase of construction has been found. ARMCO’s 1937 *Handbook of Culvert and Drainage Practice* provided directions to builders using this product. After pouring the footings, the side plates should be placed on the base angles starting at the upstream end, followed by placement of the other side plates and finally the top plates. The plates were secured in place with bolts, but the company recommended not tightening them fully until the entire arch had been completed. The company furnished 1-¹/₄" and 1-¹/₂" bolts, with the longer ones reserved for use in areas where three plates overlapped. The use of temporary props to keep the plates in place until the bolts had been tightened was suggested. With the completion of the first arch, the next one could be erected following the same process, with the plates overlapping by one corrugation. After the plates had all been put in place, the builder could finish tightening all bolts. Next, sand, gravel, or pulverized earth fill should be placed and tamped to three-quarters of the structure’s height. The company cautioned against “the vicious practice of dumping on one side only,” stressing even fill distribution. At the Stone Bridge, the rock and gravel fill came from a pit on Hat Point Road, located about 1 mile away. A report noted that it was “ideal” fill because it contained “enough rock to preclude possibility of excessive settlement” while also having “sufficient larger boulders to effectively protect the slopes against erosion.”⁶

³ Letter from William Heritage to Commissioner of Indian Affairs, December 6, 1937, in Box 67, Record Group 75: Records of the Bureau of Indian Affairs, National Archives and Records Administration-Washington, DC [hereafter cited as RG75, NARA-DC].

⁴ Memo from William Zimmerman, Jr. to Mr. Murphy, September 22, 1937, in Box 67, RG 75, NARA-DC.

⁵ Letter from William Heritage to Mr. Commissioner, September 4, 1937, in Box 67, RG 75, NARA-DC.

⁶ Armco Drainage Products Association, *Handbook of Culvert and Drainage Practice, for the solution of surface and subsurface drainage problems* (Middletown, Ohio: Armco Drainage Products Association, 1937), 421-22; William W. Halsey, Assistant Forest Engineer, to William Heritage, Production Coordinator, November 29, 1937, in Box 433, Record Group 75: Records of the Bureau of Indian Affairs, National Archives and Records Administration-Kansas City [hereafter cited as RG75, NARA-KC].

The construction of the bridge during winter required erection of a shelter over the site, both to protect the structure from the elements and to keep construction costs low. Since construction costs had appreciably risen due to the change in plans, any additional funds required for snow removal or thawing the ground would negatively impact the budget. In an interview, Ed Olson remembered big barrel stoves were located in the tent covering the bridge.⁷

By March 1938, the bridge was still not complete and only \$550 remained in the budget. A progress report on the camp's activities reported dissatisfaction with "the slowness with which the work in general was being conducted at this camp." The report's author noted that although the bridge had been built in winter, he remained "convinced that closer supervision would have kept this cost within the \$2000 that was allowed for stone work." The following month found construction "progressing very nicely" with the bridge faced in stone and only construction of the parapets remaining. Cost overruns were also attributed to the quarrying needed to obtain appropriate facing stone. Up to that point, 165 cubic yards of rock had been quarried. A sidewalk was evidently planned for the bridge after the earth fill had been compacted, but that did not come to fruition.⁸

5. Alterations and additions:

Vehicular damage to the northeast corner of the bridge railing resulted in approximately 9' of repairs to the stonework at the east end of the north parapet.

B. Historical Context:

The history of the Stone Bridge encompasses the Civilian Conservation Corps-Indian Division, the development of multi-plate arch construction, and the establishment of Grand Portage National Monument by the National Park Service. The bridge is a highly significant landmark within the community, serving as not only a vital transportation link but also a cultural symbol, evidenced in the Grand Portage Band performing group named the "Stone Bridge Singers." In addition, the bridge is a remarkably intact structure built by the Civilian Conservation Corps-Indian Division and retains a high degree of integrity.

Civilian Conservation Corps-Indian Division

Charles J. Rhoads, who had served as Commissioner of Indian Affairs under Herbert Hoover, was concerned about the impact of the Great Depression on American Indians and suggested a modified Civilian Conservation Corps (CCC) program be created for them.⁹ President Franklin D. Roosevelt signed Executive Order 6126 on May 8, 1933, allowing war veterans, American Indians, and residents of U.S. territories to enroll in the CCC, which paved the way for Rhoads' proposal. The first director of the Civilian Conservation Corps-Indian Division (CCC-ID) was

⁷ *Indians at Work* 5, no. 7 (March 1938): 411; William W. Halsey, Assistant Forest Engineer, to William Heritage, Production Coordinator, November 29, 1937, in Box 433, RG75, NARA-KC; *Grand Portage Chippewa: Stories and Experiences of Grand Portage Band Members* (Grand Portage Tribal Council and Sugarloaf Interpretive Center Association, December 2000), 91.

⁸ Unsigned letter to Commissioner of Indian Affairs, March 15, 1938, and Norman Scherer, Associate Forester, to Commissioner of Indian Affairs, April 18, 1938, both in Box 433, RG 75, NARA-KC; Letter from William Heritage to Commissioner of Indian Affairs, December 6, 1937, in Box 67, RG 75, NARA-DC.

⁹ Rhoads was a Quaker philanthropist who had served as the president of the Indian Rights Association prior to his appointment as Indian Commissioner.

Jay B. Nash, who left just five months later in September 1933. Daniel E. Murphy, a twenty-year employee with the Indian Bureau and superintendent of the Osage Agency in Oklahoma, replaced him and served until the 1940s.¹⁰

Initially known as the Indian Emergency Conservation Work program and later renamed the Civilian Conservation Corps-Indian Division, the program consisted of seven districts with a CCC work supervisor in charge of each one. The superintendent at the reservation and a local forestry or irrigation representative collaborated on choosing projects to be undertaken at each reservation, with the tribal council serving as administrator. Enrollees were not required to be aged 18 to 25, as was the case in the CCC, but they did have to be physically fit. In addition, CCC-ID participants had to agree to designate a “substantial part” of their wages to dependent relatives or allow the Indian agency to retain their wages and dispense them in installments to their designated dependents during the winter. CCC-ID enrollees generally worked on their own reservation, so living in the camp’s quarters was not mandatory. If they did so, they received a salary of \$30/month plus food and lodging. If they chose to live at home, they earned \$2.10/day for no more than twenty days a month with a maximum salary of \$42/month. Finally, enrollees did not have to commit to the CCC-ID for a specific amount of time. The CCC-ID employed approximately 77,000 American Indians during the first six years of the program who engaged in construction of forest roads, trails, and paths, fire protection, erosion control, and water supply projects.¹¹

A 1933 report on the proposed CCC-ID camps for the Consolidated Chippewa of Minnesota indicated there were 12,247 members distributed across a number of bands, including White Earth, by far the largest with 7,698 members; Fond du Lac with 1,289; Leech Lake with 880; Nett Lake with 610; White Oak Point with 542; Cass Lake with 502; Grand Portage with 376; and Mille Lacs with the smallest population of 350 members. The report also noted the Grand Portage Band in particular was “in a very destitute condition, due to the present price of fish, the source of their main income, being only 1 cent a pound with a very limited demand. So the use of some 25 men from among the population of less than 400 will prove a great help.” The Consolidated Chippewa, which included the Grand Portage Band, were the first Minnesota participants in the CCC-ID. In May 1933, the Commissioner of Indian Affairs tentatively allocated funds for six months of work for 200 men from the Consolidated Chippewa.¹²

In Minnesota, CCC-ID activities generally included controlling white pine blister rust; developing forest fire training schools; creating water supply systems through digging wells and building dams and reservoirs; building truck trails; installing miles of telephone lines; and creating fire breaks. A primary activity in the Consolidated Chippewa camps was road construction. Despite delays because of a lack of machinery, 736 miles of new road, 1,332 miles

¹⁰ John C. Paige, *The Civilian Conservation Corps and the National Park Service, 1933-1942: An Administrative History* (National Park Service, U.S. Department of the Interior, 1985), 76-77; Calvin W. Gower, “The CCC Indian Division: Aid for Depressed Americans, 1933-1942,” *Minnesota History* (Spring 1972): 5-7.

¹¹ Gower, “CCC Indian Division,” 6-7.

¹² “Report on Proposed Work Camps on Reservations of Consolidated Chippewa Indian Agency, Cass Lake, Minnesota under Emergency Conservation Act of March 31, 1933,” 1, and Letter from John Collier, Commissioner, to M.L. Burns, Superintendent Consolidated Chippewa Agency, May 10, 1933, both in Box 65, RG 75, NARA-DC.

of improved road, and 94 bridges had been completed by November 15, 1933. *Indians at Work*, a newsletter detailing CCC-ID activities, reported

there are Indians filling every position in connection with road work, from that of common laborer to that of chief engineer. By rotation of the employment of the Indians under the proposed program for next year, it is possible that 50,000 could be given work of some sort and the wages accruing to them would benefit directly or indirectly 150,000 Indians, or practically half the Indian population.¹³

In Cook County alone there were sixteen CCC and CCC-ID camps, including the one at Grand Portage (see Appendix B).¹⁴

Grand Portage Camp

Although the Grand Portage camp was not constructed until several years after the establishment of the CCC-ID, the Grand Portage Band was engaged in emergency relief work in 1933 with band members clearing 9 miles of the Grand Portage trail under the direction of Frank Boker (foreman) and Ed M. Wilson (subforeman) in July. They worked 6-1/2 hours a day with another 1-1/2 hours spent traveling to the work sites. During the clearing, they found a number of artifacts, which were given to the Cook County Historical Society. The Office of Indian Affairs considered the request to build a camp at Grand Portage in early 1936. Although land was available, there were concerns about the water supply because the geography of the site made digging a well difficult. An alternate tract of land (designated Tract No. 173 and totaling 40 acres) owned by Clyde Roberts and accepted for purchase under the Reorganization Act was instead proposed. Of that tract, 2-1/2 acres could be used for the proposed camp, and a well already on the property could provide water.¹⁵

The camp at Grand Portage was built in spring 1936 under the supervision of the CCC-ID office at Cass Lake. The camp's capacity was 100 men, although the numbers fluctuated. A November 1937 inspection report noted that fifty-three men were living at the camp while another seventeen remained in their homes in Grand Portage village. The following month found seventy-five men in residence and another twenty-five living at home. In 1938, the senior foreman at the camp was Lee M. Smith. Alton T. Bramer was the trail locator and fire guard, while Andrew B. Largo served as the recreational and educational advisor.¹⁶ Joseph F. Proff was the subforeman and clerk, and the cook was Andrew Carlson. Enrollees came from Fond du Lac, Leech Lake, Danbury, Mille Lac, White Earth, and Grand Portage reservations.¹⁷

¹³ *Indians at Work*, 1, no. 11 (January 15, 1934): 35-36.

¹⁴ CCC Research Notes in Civilian Conservation Corps, Grand Portage File, VF-C0043, Cook County Historical Society, Grand Marais, Minnesota [hereafter cited as File VF-C0043, CCHS].

¹⁵ Letter from J.S. Monks, Acting Superintendent, to Commissioner, Office of Indian Affairs, March 26, 1936, in Box 64, and Memo to Emergency Conservation Works from J.M. Stewart, Director of Lands, undated, both in Box 65, RG 75, NARA-DC; *Indians at Work*, 1, no. 4 (October 1, 1933): 23-24; "Report on Proposed Work Camps," 10.

¹⁶ Bramer was a Grand Portage band member who was elected tribal chairman in 1939.

¹⁷ "Open House to be Held at CCC Camps April 3," *Cook County News-Herald*, March 31, 1938, in File VF-C0043, CCHS; Unsigned letter to Commission of Indian Affairs, Washington, DC, December 17, 1937, in Box 433, RG 75, NARA-KC.

Work undertaken by enrollees at Grand Portage encompassed a wide range of activities, including standard CCC-ID activities like construction of trails, roads, buildings, and telephone lines, and forestry work. White pine blister rust prevention was a major focus of the Consolidated Chippewa camps given the vast stands of white pine in northern Minnesota. Blister rust is caused by a fungus (*Cronartium ribicola*) that infects white pines, causing the needles to turn red (hence the “rust”) and cankers to form that deprive the tree of water and nutrients. It was introduced to the United States in the 1890s from infected European pine seedlings.¹⁸ At Grand Portage, CCC-ID enrollees were also engaged in constructing a variety of structures. In October 1936, for example, ground was being cleared for a ranger station at Grand Portage Village. The *Indians at Work* newsletter reported that, when completed, the cobble-stone building would “be one of the most beautiful ranger stations in this part of the country.”¹⁹

By virtue of its location, there was a great deal of interest in the area’s historic resources. In collaboration with the Minnesota Historical Society, the camp enrollees undertook archaeological excavations of the former North West Company’s fur trading post in 1936 and 1937. The excavations revealed the locations of the stockade and the Great Hall. Enrollees at the Grand Portage camp erected a replica 362' x 340' stockade enclosing approximately 3 acres. In the winter of 1939-40, the 30' x 95' Great Hall was reconstructed based on the archaeological evidence. The hall contained a small museum with Chippewa-made objects completed as part of a Works Progress Administration (WPA) project. The endeavor was “a co-operative project, engaging the resources of the WPA, the United States Indian Service, the Minnesota Historical Society, and the Cook County Historical Society.”²⁰

By September 1, 1938, the total value of the land and improvement at the Grand Portage Reservation due to CCC-ID work was \$81,884.26. This included newly constructed foot bridges, the Stone Bridge, telephone lines, the Sophie Mountain Lookout Tower, truck and foot trails, and Tamarack Point picnic grounds; wild rice seeding at Swamp Lake; reconstruction of the stockade road; and restoration of the stockade. The buildings and plant built at Grand Portage totaled \$35,149.85. This represented a patrol cabin, ranger station, Mount Sophie Lookout house, and the camp buildings, including the barracks, recreational building, warehouse, and light plant.²¹

¹⁸ O.C. Maloy, “White Pine Blister Rust,” *The Plant Health Instructor*, 2008, available online at <http://www.apsnet.org/edcenter/intropp/lessons/fungi/Basidiomycetes/Pages/WhitePine.aspx>, and Dan Gilman, “White Pine Blister Rust,” University of Minnesota Extension, available online at <http://www.extension.umn.edu/garden/yard-garden/trees-shrubs/white-pine-blister-rust/>, both accessed February 5, 2016.

¹⁹ William Heritage, Production Coordinator, to Commissioner of Indian Affairs, Washington, DC, October 1, 1936, in Box 433, RG75, NARA-KC; “Open House to be Held”; *Indians at Work* 4, no. 5 (October 15, 1936): 50-51, quote from page 51.

²⁰ *Minnesota History* 17, no. 4 (December 1936): 461; *Minnesota History* 18, no. 4 (December 1937): 456; Willoughby M. Babcock, “Reconstruction at Grand Portage,” *Minnesota History* XXI (1940): 206-207, quote from page 207, all in File VF-C0043, CCHS. The stockade and Great Hall reconstruction project is beyond the scope of this report, but photographs of the site can be found at HABS MN-76, Grand Portage National Monument, Buildings Complex.

²¹ Report, September 1, 1938, Grand Portage Reservation, in Box 65, RG 75, NARA-DC.

In addition to the work, camp enrollees took classes to acquire job skills and engaged in recreational activities. Classes offered included forestry, English, and math, while training in skills like carpentry, cabinet work, and rustic furniture making were also available. Grand Portage Camp was known for its sports teams, having won the North Shore Champions Trophy in baseball and basketball in 1936 and in basketball again in 1937, as well as a gold loving cup for sportsmanship.²²

Regular inspection visits of camps took place. In February 1938, the acting camp supervisor, Norman W. Scherer, reported his dissatisfaction with Andrew Lago, the camp assistant. Scherer stated he did not find him “fully qualified for his position; nor does this report show that he carries his load; nor would I say that he is bubbling over with cooperation. The promises are many, the accomplishments are few.” Scherer ended by suggesting an investigation with “appropriate action” be undertaken.²³ A March 30 letter reported to the Commissioner of Indian Affairs that conditions had improved, but the following month saw another complaint about the “untidy condition” of the camp. The Grand Portage camp closed in winter 1938, not because of management problems but due to lack of funds. An alternative mobile unit was established, in which enrollees lived at home but still worked during the day on CCC-ID projects, like the Stone Bridge. Those enrollees who had resided at the camp but were not local were moved to the barracks at Nett Lake so that no enrollee would be left unemployed.²⁴

Further information about the Grand Portage camp can be found in oral histories. Jim Wipson was only 16 but lied about his age so that he could join the CCC-ID. Part of his time was spent at the Grand Portage camp helping with the stockade reconstruction. Wipson’s mother also worked at Grand Portage doing sewing and beadwork as part of a WPA project. Betty Lou Hoffman recalled that the “old fort played a big role in the life of the Grand Portage community. Lots of people from the community helped to build the old fort, and many women worked there making crafts, which were on display there.”²⁵

Multi-Plate Arch Construction

The ARMCO multi-plate arch used in the Stone Bridge originated in a patent for a corrugated-metal culvert (Patent No. 559,642), granted on May 5, 1896, to James H. Watson, who operated a sheet-metal shop in Crawfordsville, Indiana. City engineer E. Stanley Simpson is said to have actually designed the initial patented culvert after seeing “his neighborhood druggist wrap a bottle of medicine in a piece of cardboard.” This reportedly sparked his imagination, causing him to wonder “Why not make a culvert of metal corrugated like the cardboard, for extra strength?”

²² J.H. Mitchell, Camp Supervisor, to Commissioner of Indian Affairs, Washington, DC, November 5, 1937, in Box 433, RG 75, NARA-KC; *Indians at Work* 4, no. 18-19 (May 1937): 49.

²³ Norman W. Scherer, Acting Camp Supervisor, to Commissioner of Indian Affairs, February 11, 1938, in Box 433, RG 75, NARA-KC.

²⁴ William Heritage, Production Coordinating Officer to Commissioner of Indian Affairs, March 30, 1938; Norman Scherer, Associated Forester, to Commissioner of Indian Affairs, April 18, 1938; and unsigned letter to Commissioner of Indian Affairs, March 15, 1938, all in Box 433, RG 75, NARA-KC. See also “The Minnesota Chippewa News Bulletin,” November 21, 1938, in File VF-C0043, CCHS.

²⁵ *Grand Portage Chippewa: Stories and Experiences*, 23, 95.

Simpson then took his idea to Watson, and the two worked together on fabricating such a culvert.²⁶

Watson died in 1899, and a Montgomery County, Indiana, road supervisor named William Q. O'Neill purchased Watson's half share of the patent in April 1903 while Simpson retained his half. With the formalization of the partnership, O'Neill and Simpson established a plant in Crawfordsville and began selling license agreements to companies throughout the Midwest for the manufacture of their patented culvert. On May 31, 1904, O'Neill bought Simpson's share of the patent. The expansion of license agreements continued into Kansas, Minnesota, Iowa, Missouri, Pennsylvania, and Delaware.²⁷

Meanwhile, the American Rolling Mill Company (ARMCO), established in 1900 in Middletown, Ohio, had been developing a new type of metal suitable for use in culverts. George Verity brought a group of investors together to create "the world's first truly integrated steel mill" according to company literature. On November 23, 1909, the company received patents for "Ingot Iron," a low-carbon and low-manganese product that resisted corrosion. (Patent No. 940,784 was for the process; Patent No. 940,785 was for the product.) Ingot Iron was marketed to all the companies licensed under the Watson Patent as an alternative to the steel sheets generally used.²⁸

The Watson Patent expired in 1913 but ARMCO continued manufacturing a corrugated-metal pipe that was essentially the same patented culvert but with some improvements. Because of the need for a corrugated-metal pipe with a heavier gage and larger diameter that could serve as a small bridge, J.R. Freeze and George E. Shafer developed ARMCO multi-plate in the early 1930s. However, "while the larger diameters and the strength of the MULTI-PLATE [capitalization in original] Pipe met a real need, it was only on the market a short time." ARMCO instead developed plates that could be formed into an arch, which allowed for ease of shipping and construction in the field.²⁹

By 1937, ARMCO multi-plates were being manufactured in a variety of sizes, including No. 1 gage at 9/32 inch; No. 3 gage at 1/4 inch; No. 5 gage at 7/32 inch; No. 7 gage at 3/16 inch; No. 8 gage at 11/64 inch; No. 10 gage at 9/64 inch; and No. 12 gage at 7/64 inch. The sheets could be made in full and half widths, and four lengths were available. Plates were flat or could be curved to a radius of 30" or larger. The corrugations were located at right angles to the length of the sheet, with bolt holes "in each crest and valley in staggered rows 2 inches apart on each longitudinal edge of the plate" plus another three holes on each end corrugation. The final product was shipped to the construction site nested together for ease of transport.³⁰

²⁶ "Out of an Idea—An Industry: The History of Armco Drainage & Metal Products, Inc., 1896-1959," (Middletown, OH: Armco Drainage & Metal Products, Inc., 1961), 2-3, quote from page 3.

²⁷ "Out of an Idea," 4.

²⁸ "Out of an Idea," 5-6; Verity, *Faith in Men*, 12; "American Ingot Iron," *Industrial World* 44, no. 7 (February 14, 1910): 188-189.

²⁹ "Out of an Idea," 18.

³⁰ Armco Drainage Products Association, *Handbook of Culvert and Drainage Practice, for the solution of surface and subsurface drainage problems* (Middletown, OH: Armco Drainage Products Association, 1937), 93-94.

The advantage of multi-plate was the ease and efficiency of installation. The use of Ingot Iron ensured little to no maintenance and a long service life. There was also flexibility in design. Initially developed for culverts, it soon became used for bridges with short spans where cost was a major factor. Concrete or stone headwalls could be constructed with multi-plate structures to change the look of the span, depending on budget. As a result, multi-plate spans were often built in New Deal projects. In Minnesota, thirty-five such multi-plate “stone arch” bridges were identified in 1988.³¹

Bridge Construction

As described earlier, archeological excavation by the Minnesota Historical Society and a CCC-ID crew led to the discovery of the North West Company fur trading post stockade fence. This necessitated the realignment of the Stockade Road (Project 202 C 455), which extended through the former stockade area, and required a new bridge spanning Grand Portage Creek (see Figure 2, Appendix A). The new 20'-wide gravel road went past the north end of the stockade and then made a Y, with one leg extending north and the other east. The Stone Bridge was needed on the east leg, about 100' from the original wood span (see Figure 3, Appendix A).³²

Construction of Stone Bridge (Project 104 C 454) was approved on July 26, 1937, for a total cost of \$2,000, well below the \$4,586 detailed in the construction schedule. Although the bridge design had substantially changed, adjustments were evidently not made to the allocated funds. The schedule for the structure included:

- Footing excavation of 100 cubic yards of dirt with labor = \$272.15;
- 6'-long, 110 lineal feet coffer dam construction with labor = \$112.50;
- Concrete forms totaling 43 cubic yards with labor, carpenter, and lumber = \$246.91;
- Concrete footings totaling 43 cubic yards with labor, trucks, and 240 sacks of cement = \$526.29;
- Metal arch spans 20' and 30' long totaling 11,276 pounds of steel = \$1008;
- Field supervision cost = \$100; and
- Overhead costs = \$350.

The stone work was scheduled separately and consisted of:

- Concrete footing for two retaining walls, each 50' long with materials (including 90 sacks of cement) and labor = \$345 or \$23/cubic yard; and
- “Ashlar type stone works” totaling 74 cubic yards with labor, quarrying, and materials = \$1626 or \$22/cubic yard.³³

³¹ Armco Drainage Products Association, *Handbook*, 265; Armco Culvert Manufacturers Association, “Lifetime Armco Multi Plate for Bridges, Culverts, Large Drains,” 1934; Frederic Quivik and Dale Martin, “Iron and Steel Bridges in Minnesota,” National Register of Historic Places, Multiple Property Nomination Form, 1988.

³² Project 202 C 455, Stockade Road Reconstruction, and Letter from William Heritage to Mr. Commissioner, September 4, 1937, both in Box 67, RG 75, NARA-DC.

³³ Both schedules in letter from William Heritage to Commissioner of Indian Affairs, December 6, 1937, in Box 67, RG 75, NARA-DC.

There were delays in construction. The bridge width had to be increased by one-third to accommodate traffic and meet county standards. An unexpectedly heavy rainfall in late March 1938 caused the creek to rise 3' in just two hours, leading to legitimate concerns that the shelter over the construction site would be destroyed and all the fill would be washed away. According to the *Cook County News-Herald*, the entire camp “worked furiously constructing a sand bag retaining wall and cleaning out a log, brush and ice jam” to successfully protect the bridge and road fill.³⁴

With the completion of the bridge in summer 1939, the impact of not having an experienced stone mason on hand to direct the stonework was evident. While the work had reportedly been done “fairly well” despite the crew’s lack of experience, those in charge believed “there is room for considerable improvement.”³⁵ Associate Forest Engineer William W. Halsey noted that the bridge was structurally sound but the mistakes in the stonework detracted from its appearance. He went on to point out,

the most serious of these shows plainly in the choice and placement of the stone arch segments in the upstream side....Note that some of the blocks are obviously poorly chosen for shape particularly near the right base, and that toward the top of the arch the individual blocks are not placed radially, i.e., perpendicular to the arch of the steel....In the horizontal courses of the spandrel walls, here and there a long block is so placed that its long axis is noticeably not truly horizontal. This is not especially serious in a wall of random masonry such as this, but does detract from the appearance, even though the true nature of the defect is not apparent at first sight.

In conclusion, Halsey reiterated these were minor errors and blamed them on a lack of supervision.³⁶

Establishment of Grand Portage National Monument

On August 9, 1951, this area was designated a National Historic Site under the Historic Sites Act of 1935 by the Secretary of the Interior. Historian Merrill J. Mattes credits conservationists like Sigurd “Sig” Olson and the Wilderness Society with pushing the creation of the historic site as a way to begin protecting the northern Minnesota wilderness. A cooperative agreement signed by the Secretary of the Interior, the Minnesota Chippewa Tribe, and the Grand Portage Band as part of the historic site creation specified that the National Park Service would provide technical assistance while the Chippewa retained control and ownership. By 1953, there was some discussion of surrendering land to the Federal government, although there was also opposition.

³⁴ Letter from William Heritage to Commissioner of Indian Affairs, December 6, 1937; and “News from CCC-ID Camp,” *Cook County News-Herald*, March 31, 1938, and “Grand Portage Newsettes,” *Cook County News-Herald*, March 31, 1938, both in File VF-C0043, CCHS.

³⁵ W.J. Clark, Chief Clerk in Charge, by C.J. Evans, Sr. Project Manager, to Commissioner of Indian Affairs, July 8, 1939, in Box 433, RG 75, NARA-KC.

³⁶ William W. Halsey, Assistant Forest Engineer, to Commissioner of Indian Affairs, July 5, 1938, in Box 433, RG 75, NARA-KC.

Judge C. R. Magney, Mrs. Effie McClean (president of the Cook County Historical Society), and Alton Bramer advocated for the establishment of the national monument.³⁷

Congress approved the establishment of Grand Portage National Monument on September 2, 1958, contingent upon the Minnesota Chippewa Tribe and the Grand Portage Band relinquishing their titles to land and interests within the proposed monument boundaries to the Department of the Interior. This provision was necessary because the monument would be located on 709.97 acres of the Grand Portage Indian Reservation. The agreement included provisions for preferential treatment for the Minnesota Chippewa Tribe in contracts for visitor services, construction and maintenance employment, and producing and selling handcrafts at the monument. The Chippewa were also granted the right to travel through the monument as part of their usual logging, fishing, and boating activities and provided areas of use. The monument was formally created on January 27, 1960. If the Federal government should ever abandon the monument, the land would revert to the Minnesota Chippewa Tribe and the Grand Portage Band.³⁸

Grand Portage National Monument was created, in part, to preserve the history of the fur trade. American Indians showed the “voyageurs” traveling from western Canada to the United States in the eighteenth century a footpath to bypass the cascades and rapids of the lower 20 miles of the Pigeon River. Known as “Le Grand Portage” or the “Great Carrying Place,” the path traveled a pre-glacial stream bed, allowing voyageurs carrying furs and goods access to Lake Superior. This path followed a trail that was actually thousands of years old. The North West Company established a fur trading post in 1784 on the lake’s shore, but it was abandoned in 1802 due to concerns about import taxes. In the 1830s and 1840s, the American Fur Company (established by John Jacob Astor) and some independent fur traders set up operations at the former North West post, but these were soon abandoned. The United States later established the Chippewa reservation.³⁹

In the early twentieth century, the Minnesota Historical Society (founded in 1849) became concerned about the preservation of Grand Portage, even though the fur trading post had disappeared long before. In June 1922, Cecil W. Shirk of the Minnesota Historical Society (MHS) and Paul Bliss of the *Minneapolis Journal* traveled to the area and published a report on what they found, including support for preservation of the historic resources. That same year, the MHS convention in Duluth resolved to request that the Minnesota Legislature establish a state park at Grand Portage that would include the historic portage trail, Split Rock Canyon, and Pigeon River.⁴⁰ Dr. Solon J. Buck, Superintendent of the MHS next traveled to the site with State

³⁷ Ron Cockrell, “Grand Portage National Monument, Minnesota: An Administrative History” (National Park Service, Midwest Regional Office, Office of Planning and Resource Preservation, Division of Cultural Resources Management, September 1982, revised October 1983), 31-35.

³⁸ Cockrell, “Grand Portage National Monument,” 1-2, 17. Within the monument’s proposed boundaries, the Grand Portage Band had 258 acres while the Minnesota Chippewa tribe had 50 acres, see Cockrell, “Grand Portage National Monument,” 36.

³⁹ Cockrell, “Grand Portage National Monument,” 5-9.

⁴⁰ Cockrell, “Grand Portage National Monument,” 10-11.

Auditor Ray P. Chase in preparation for drafting legislation to establish a “state department of parks to acquire, preserve, and interpret historic and scenic attractions.”⁴¹

These plans to create a state park were put on hold because of land ownership issues. The Land Allotment Act of 1889 “appointed the Federal government the guardian, or trustholder, of all Indian reservation lands.” Therefore, an act of Congress would be necessary to acquire the necessary land. Nevertheless, the MHS remained interested in preserving the site. In 1931, they held a convention at the site commemorating the landing of explorer and fur trader Pierre la Verendrye on August 22, 1731. It was not until relief work funding was granted to the CCC-Indian Division, Consolidated Chippewa Agency of Minnesota in 1936, however, that significant investigation at the site could take place. With a tight deadline of five months to expend \$6,200 in federal funds for reconstructing the palisade, the Indian Service turned to the MHS for assistance. Willoughby M. Babcock and Ralph D. Brown of MHS led the excavation by Grand Portage Camp enrollees to determine the location of the palisade and entrance gate as well as thirteen structures. From 1938-40, enrollees reconstructed the stockade and the Great Hall on its foundation. The completed Great Hall included a museum featuring Chippewa crafts and a souvenir and sandwich shop run by the Grand Portage Band. The portage trail was later cleared again in 1946 by the Indian Service, Duluth-area businessmen, and the Boys Scouts North Star Council 286 of Duluth.⁴²

In 1969, lightning struck the roof of the Great Hall, causing a fire that destroyed the building. The MHS conducted a second series of excavations at the site that led to corrections of the inaccuracies in the original reconstruction. Chippewa day laborers completed the second reconstruction in 1973 using timber from reservation lands. The Grand Portage National Monument was listed in the National Register on September 14, 1977.⁴³

Part II. Structural/Design Information

A. General Statement:

1. Character: The Stone Bridge is a representative example of the rustic aesthetic that characterized both National Park Service and Civilian Conservation Corps construction projects. The use of stone cladding belied the multi-plate arches that actually formed the structure.

2. Condition of fabric: The bridge is in remarkably good condition given its heavy use and lack of rehabilitation since its original construction. The bridge’s headwalls, wingwalls, and parapets are skewing outward, which is most evident at the east approach. There are areas where mortar is cracking as well. Repairs to the east end of the north bridge railing were not done in kind, and there is a stone missing on the east end of the south bridge railing.

B. Description:

⁴¹ Cockrell, “Grand Portage National Monument,” 12.

⁴² Cockrell, “Grand Portage National Monument,” 14-16.

⁴³ Cockrell, “Grand Portage National Monument,” 21, 51, 60.

The single-span Stone Bridge crosses Grand Portage Creek and provides important access to the nearby Grand Portage Band school and community buildings. This bridge is heavily used by residents as it provides a vital link between the two portions of the Grand Portage community. The north elevation measures 50'-5 $\frac{1}{2}$ " from the ends of the parapet, while the south elevation is 51'-8 $\frac{7}{8}$ " from the ends of the parapet. The 28'-6"-wide deck is paved.

The bridge's structure consists of a bolted ARMCO corrugated multi-plate arch of galvanized steel with a zinc coating. The 3'-5" x 10' plates sit on cast-in-place concrete footings; the abutments are also concrete. Bolts are located at each corrugation where the pieces of the arch meet. At the junction of the arches with the footings, the bolts are located at every second corrugated ridge.

The headwalls, wingwalls, and parapets are native ashlar slate with inset aggregate mortar joints. Ashlar refers to dressed stonework where the exposed face is square or rectangular. Stone stringcourses visible on the exterior facades separate the headwalls from the parapets. The semicircular arch is nearly 19' wide from the concrete footings and stands just over 7' tall from the keystone. Stone voussoirs delineate the arch. The parapets feature a top course of stones placed vertically and topped with flat stone slabs. They end in pilasters that are slightly wider than the main section of the parapets. Both parapets vary in height, with the center of the north interior measuring 2'-5 $\frac{5}{8}$ " and the south interior 2'-4".

A final noteworthy feature is the remnants of stone pavers on the bank by the northwest corner of the bridge (see Figure 4, Appendix A).⁴⁴

D. Site Information:

The Stone Bridge is located within Grand Portage National Monument and carries Route 17 over Grand Portage Creek. Route 17 (Mile Creek Road) travels along the shoreline, providing community members access to the school, clinic, community center, and their residences, and park visitors with vehicular access from the visitor center to the trading post reconstruction and dock. Route 73 extends north from Route 17 just to the west of the Stone Bridge. To the east of the bridge, the Upper Road forks off from Route 17 and extends north. This road provides access to the Holy Rosary Catholic Church and various community facilities like the school and health center. Mile Creek Road continues along the Lake Superior shoreline for approximately 0.19 miles, where it dead ends.

The banks of the creek are overgrown with vegetation, but to the west of the bridge, flat expanses of field dotted with stands of trees provide views of Lake Superior.

Part III. Sources of Information

A. Primary Sources:

Record Group 75: Records of the Bureau of Indian Affairs, National Archives and Records Administration-Kansas City, Missouri

⁴⁴ Description based on field visit in October 2015, and Mead & Hunt, Minnesota Department of Transportation, Local Historic Bridge Report, Bridge Number 7614, August 2014.

Folder 2: Officials and Employees—Reports of Traveling Officials June 1933, to June 30, 1939, in Box 433, Inspection Reports and IECW Weekly Group Reports.

Minneapolis Area Office (508795-508796), in Box 31, Weekly CCC-ID Newsense Beginning March 25, 1938.

Record Group 75: Records of the Bureau of Indians, Series: Civilian Conservation Corps-Indian Division, Entry 1000: General Records 1933-44, National Archives and Records Administration-Washington, DC

Boxes 64-72 include Consolidated Chippewa files.

Civilian Conservation Corps/Grand Portage File, VF-C0043. In Cook County Historical Society, Grand Marais, Minnesota.

Armco Culvert Manufacturers Association. "Lifetime Armco Multi Plate for Bridges, Culverts, Large Drains." 1934.

Armco Drainage Products Association. *Handbook of Culvert and Drainage Practice, for the solution of surface and subsurface drainage problems*. Middletown, OH: Armco Drainage Products Association, 1937.

Indians at Work, various dates.

B. Secondary Sources:

Cockrell, Ron. "Grand Portage National Monument, Minnesota: An Administrative History." National Park Service, Midwest Regional Office, Office of Planning and Resource Preservation, Division of Cultural Resources Management. September 1982, revised October 1983.

Gower, Calvin W. "The CCC Indian Division: Aid for Depressed Americans, 1933-1942." *Minnesota History* (Spring 1972): 3-13.

Grand Portage Chippewa: Stories and Experiences of Grand Portage Band Members. Introduction by Donald J. Auger and Paul Driben. Grand Portage Tribal Council and Sugarloaf Interpretive Center Association, December 2000.

Mead & Hunt. Minnesota Department of Transportation, Local Historic Bridge Report, Bridge Number 7614. August 2014.

"Out of an Idea—An Industry: The History of Armco Drainage & Metal Products, Inc., 1896-1959." Middletown, OH: Armco Drainage & Metal Products, Inc. 1961.

Paige, John C. *The Civilian Conservation Corps and the National Park Service 1933-1942: An Administrative History*. National Park Service, U.S. Department of the Interior, 1985.

Quivik, Frederic and Dale Martin. "Iron and Steel Bridges." National Register of Historic Places, Multiple Property Nomination Form, 1988.

Verity, C. William, Jr. *Faith in Men: The Story of Armco Steel Corporation*. New York: The Newcomen Society in North America, 1971.

C. Likely Sources Not Yet Investigated:

Not known.

Appendix A: Historic Photographs

BRIDGES and CULVERTS • Plate E-6



Canyon Park, Oklahoma City, Oklahoma



Wintersmith Metropolitan Park, Ada, Oklahoma



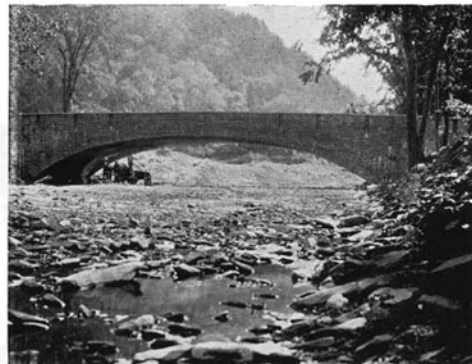
McCormick's Creek State Park, Indiana

Stone Arch Bridges

Five stone park bridges that exhibit wide variety of stone techniques and arch forms. The latter range from semicircular to the flattened form of the lengthy span at Taughannock Falls State Park. Noteworthy in the example directly to the left is the fact that the stone arch is not mere facing of a concrete arch but extends the full width of the bridge and functions structurally.



Buttermilk Falls State Park, New York



Taughannock Falls State Park, New York

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Figure 1: Page 50 from the 1935 *Park Structures and Facilities*, which was the design inspiration for the Stone Bridge.



Figure 2: View of original road and bridge, marked by arrow. Courtesy of Grand Portage Museum, Mary Ann Gagnon.



Figure 3: Completed road and bridge. Courtesy of Grand Portage National Monument.



Figure 4: View of stonework on bank, some of which is still visible. Courtesy of Grand Portage National Monument.

Appendix B: Table

CCC and CCC-ID camps in Cook County, based on Barbara W. Sommer's *Hard Work and a Good Deal*.

Camp Name	Camp #	Dates	Work Location/Notes
Wanless	Camp F-3	1933-35	Superior National Forest
Temperance River	Camp F-19	1933-34, 1934-36	Superior National Forest/closed for brief time
Sawbill	Camp F-10	1933-41	Superior National Forest
Seagull	Camp F-55, P-55	1935-39	Superior National Forest and private forest/most isolated camp in Minnesota
Spruce Creek Highway Wayside (Cascade River Wayside)	Camp SP-13, DSP-5	1934-36	Built Cascade River Overlook/sponsored by Minnesota Department of Highways and under supervision of National Park Service; overlook was one of first kind in county and incorporated rock outcroppings
Poplar Lake Camp	Camp F-41	1934-36	Superior National Forest/organized at Fort Snelling and made up of veterans
Northern Light	Camp F-6	1933-37	Superior National Forest/organized at Fort Snelling
Mineral Center	Camp S-68	1933	Grand Portage State Forest
Gunflint Lake	Camp S-67	1933-34	Grand Portage State Forest
Hovland	Camp S-62	1933-37	Grand Portage State Forest/organized at Fort Snelling
Grand Portage (Mineral Center)	Camp S-68	1936-42	Enrollees from Minnesota Consolidated Chippewa reservation
Gunflint 1 Camp	Camp F-5	1933-42	Superior National Forest/organized at Camp Snelling, one of 2 federal forest camps continuously open in Minnesota during duration of CCC
Good Harbor (Cascade)	Camp F-20	1933-36	Superior National Forest
Cross River	Camp F-43	1935-37	Superior National Forest
Caribou	Camp F-11	1933-34, 1934-35	Superior National Forest
Cascade (Devils Track Lake)	Camp F-4	1933-34, 1934-37	Superior National Forest

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

STONE BRIDGE

HAER MN-126

(Bridge 7614)

Grand Portage National Monument

CSAH 17 spanning Grand Portage Creek

Grand Portage

Cook County

Minnesota

INDEX TO BLACK AND WHITE PHOTOGRAPHS

Jeremy T. Mauro, photographer, October 2015

MN-126-1	Eastern approach view of Stone Bridge from bend in Route 17, looking west.
MN-126-2	Western approach from foot of Mount Rose, looking east.
MN-126-3	Oblique view of bridge, looking southeast.
MN-126-4	South elevation showing upstream view of Grand Portage Creek, looking north.
MN-126-5	Oblique view of south elevation of bridge, looking northeast.
MN-126-6	Oblique view of south elevation of bridge, looking northwest.
MN-126-7	North elevation of bridge, looking south.
MN-126-8	Oblique view of north elevation showing double conduit, looking southwest.
MN-126-9	Elevation of north parapet wall, looking north.
MN-126-10	Detail of south parapet wall, showing displacement in southeast endpost, looking south.

STONE BRIDGE

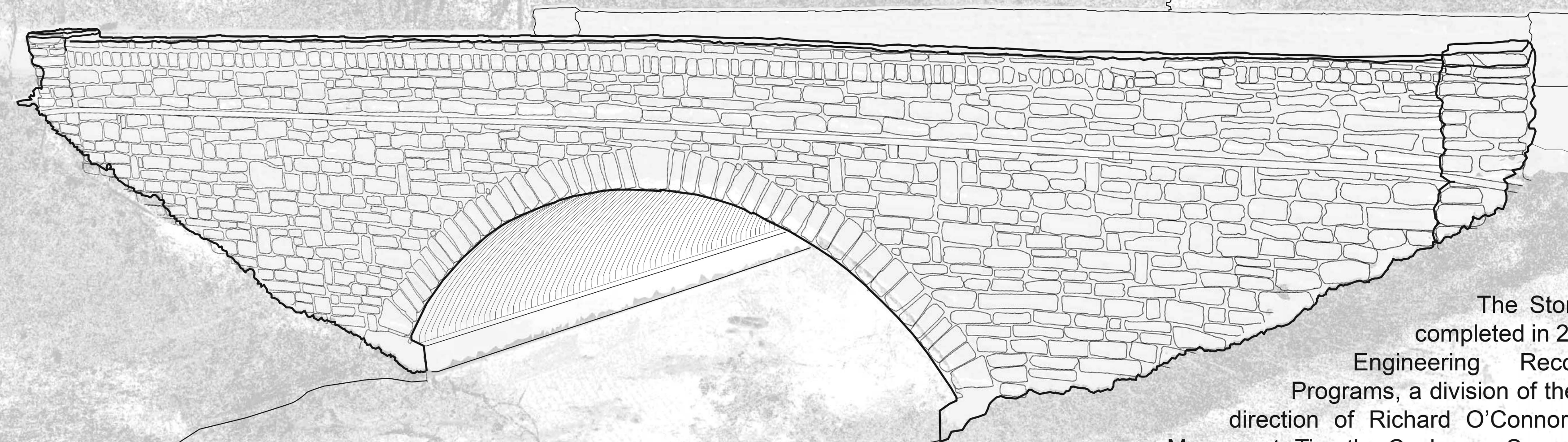
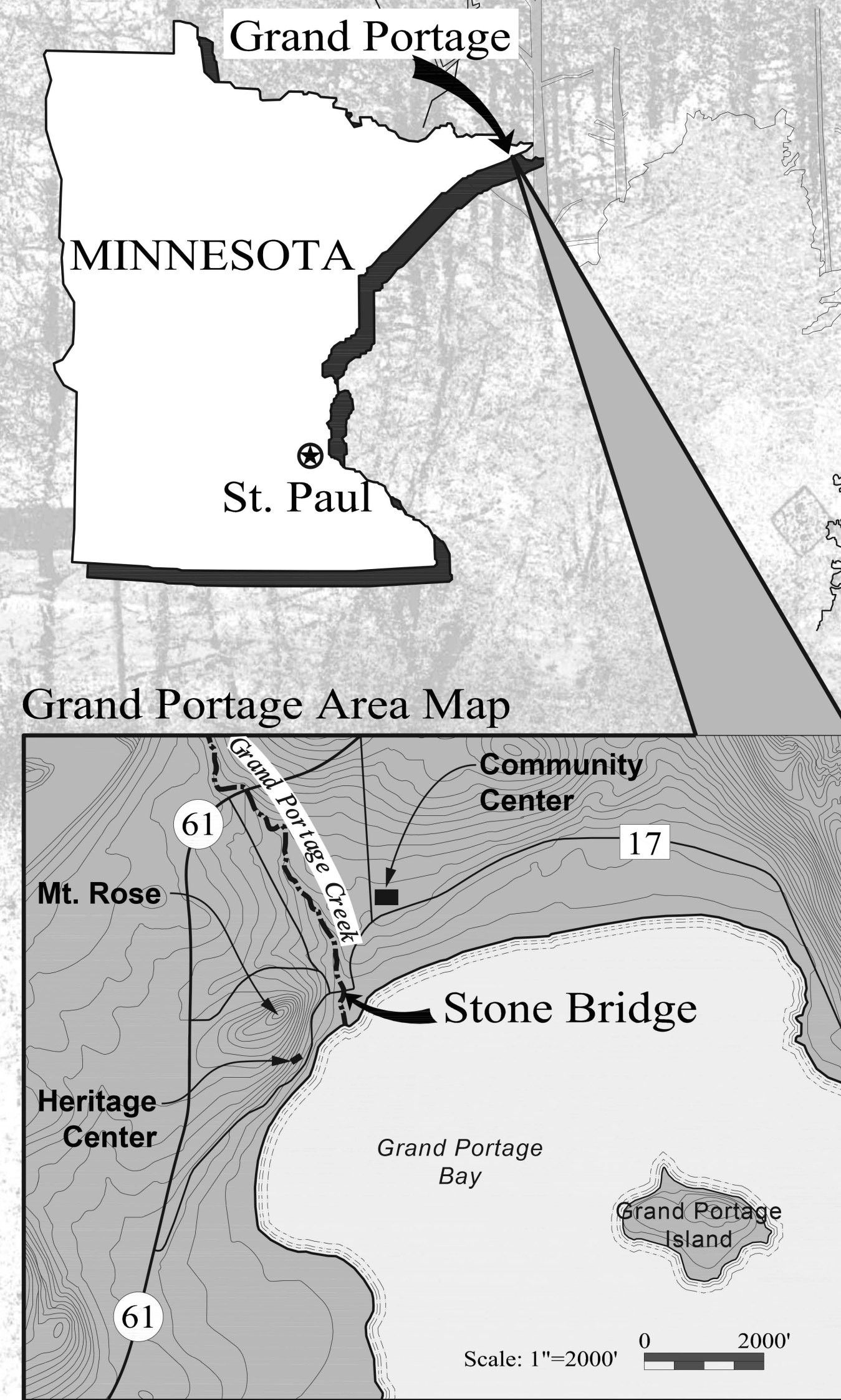
1938

GRAND PORTAGE NATIONAL MONUMENT



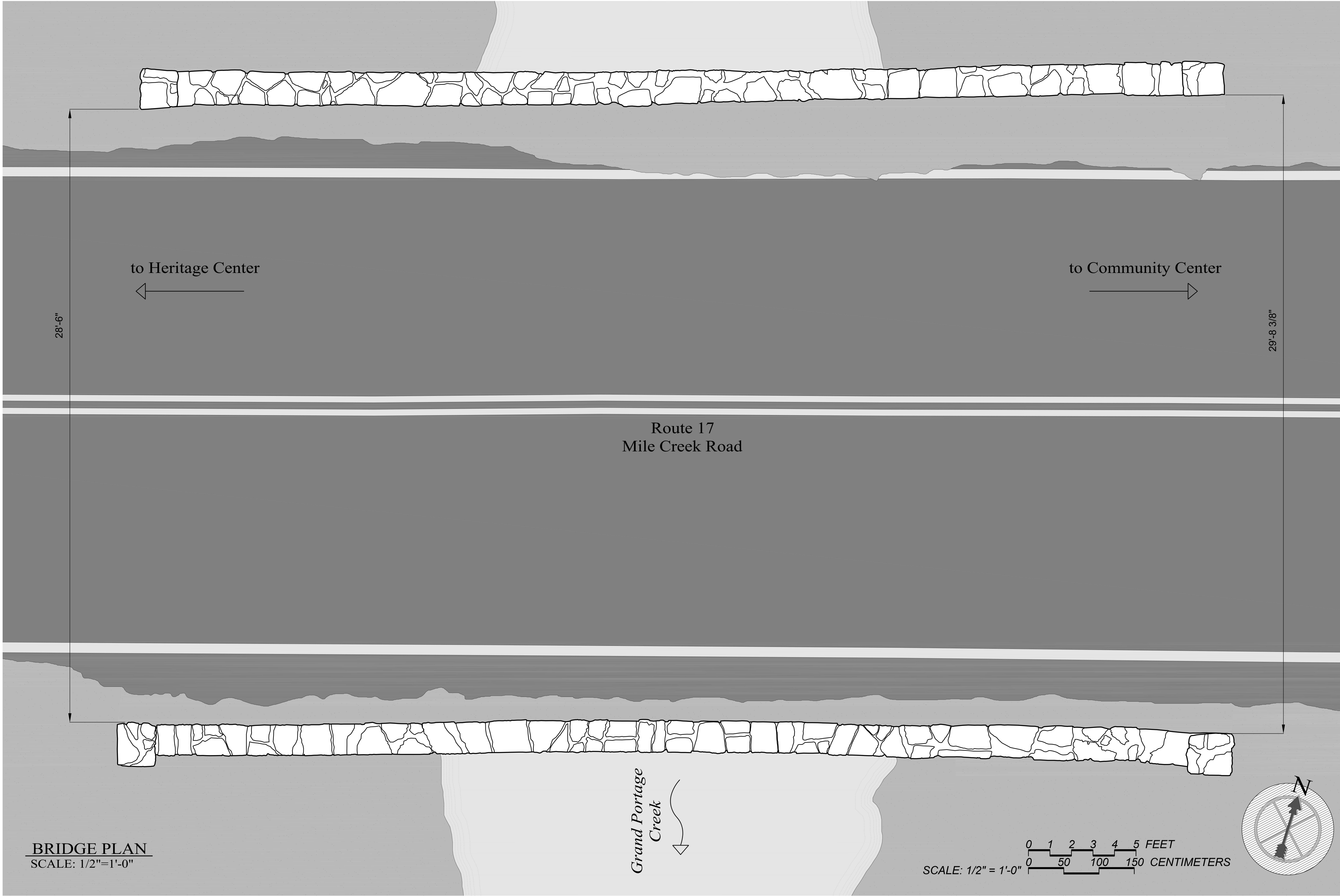
Located within Grand Portage National Monument, the Stone Bridge carries Route 17 over Grand Portage Creek, providing access to Grand Portage Band community facilities. The 1938 bridge has become a highly significant landmark in the community, in addition to its association with the Civilian Conservation Corps-Indian Division (CCC-ID). Charles J. Rhoads, Commissioner of Indian Affairs in Herbert Hoover's administration, proposed establishing a modified CCC program for American Indians in 1933. President Franklin D. Roosevelt's Executive Order 6126, signed on May 8, 1933, authorizing the enrollment of war veterans, American Indians, and residents of U.S. territories, paved the way for Rhoads' proposal. The Grand Portage CCC-ID camp was built in 1936, and enrollees, primarily from the Grand Portage Band of the Minnesota Chippewa Tribe, worked on a variety of projects, including white pine blister rust prevention and construction of trails and telephone lines. Under the direction of the Minnesota Historical Society, enrollees undertook archaeological excavations of the former North West Company's fur trading post and engaged in the subsequent reconstruction of the stockade and the Great Hall.

The original plans for the Stone Bridge are unknown, but a 1937 memo from the Indian Office requested that the plans be changed to a stone arch bridge like those shown in the Park Structures and Facilities publication by the National Park Service. Accordingly, the bridge was built of prefabricated multi-plate arches supplied by ARMCO Drainage Products. The American Rolling Mill Company (ARMCO), established in 1900 in Middletown, Ohio, held the patent for multiple plates, which consisted of corrugated plates of various dimensions for use in culvert construction. New Deal projects often utilized ARMCO multi-plate arches because the galvanized, corrugated iron was manufactured in curved segments that were shipped nested together and bolted on site. Grand Portage camp enrollees then used native stone in the headwalls, wingwalls, and railings, giving the bridge its rustic appearance.



The Stone Bridge Recording Project was completed in 2015-2016 by the Historic American Engineering Record, Heritage Documentation Programs, a division of the National Park Service, under the direction of Richard O'Connor, Chief. Grand Portage National Monument, Timothy Cochrane, Superintendent, and the Grand Portage Band sponsored the project. Christopher H. Marston, HAER Architect, served as Project Leader. The field team consisted of Jeremy Mauro and John Wachtel, HAER, and Jocelyn Belmonte, Montgomery College. Jeremy Mauro produced the large-format photographs, and Justine Christianson, HAER Historian, wrote the historical report.

Latitude: 47.963590 Longitude: -89.683631



DELINEATED BY: JOCELYN BELMONTE, JOHN WACHTEL, 2016

STONE BRIDGE
RECORDING PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

GRAND PORTAGE

STONE BRIDGE
CSAH 17 SPANNING GRAND PORTAGE CREEK
COOK COUNTY

MINNESOTA

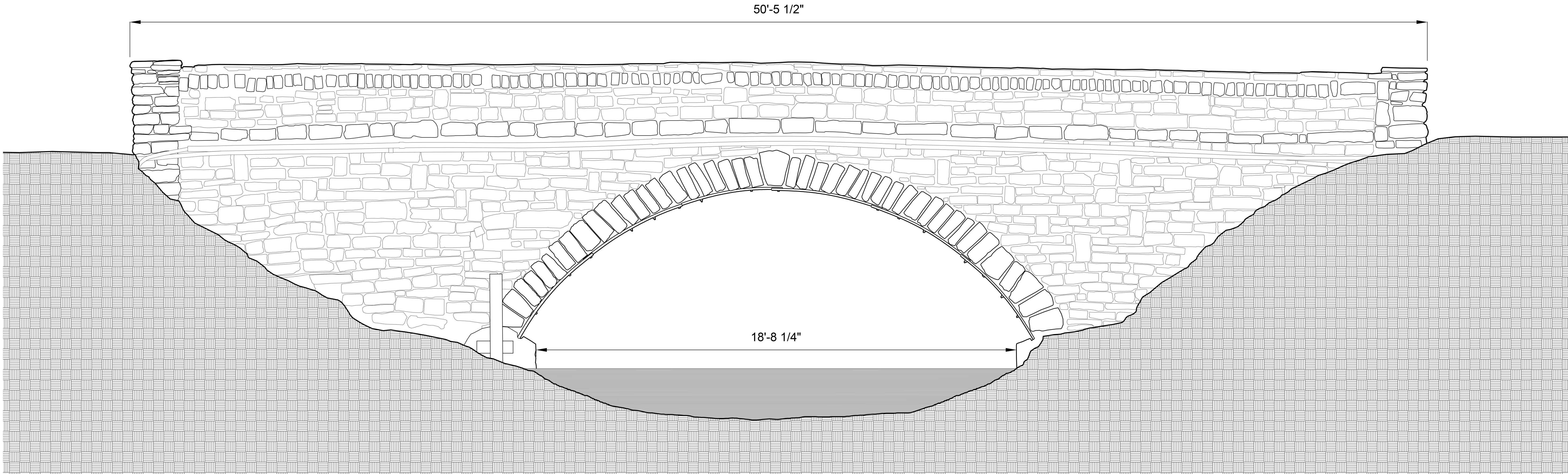
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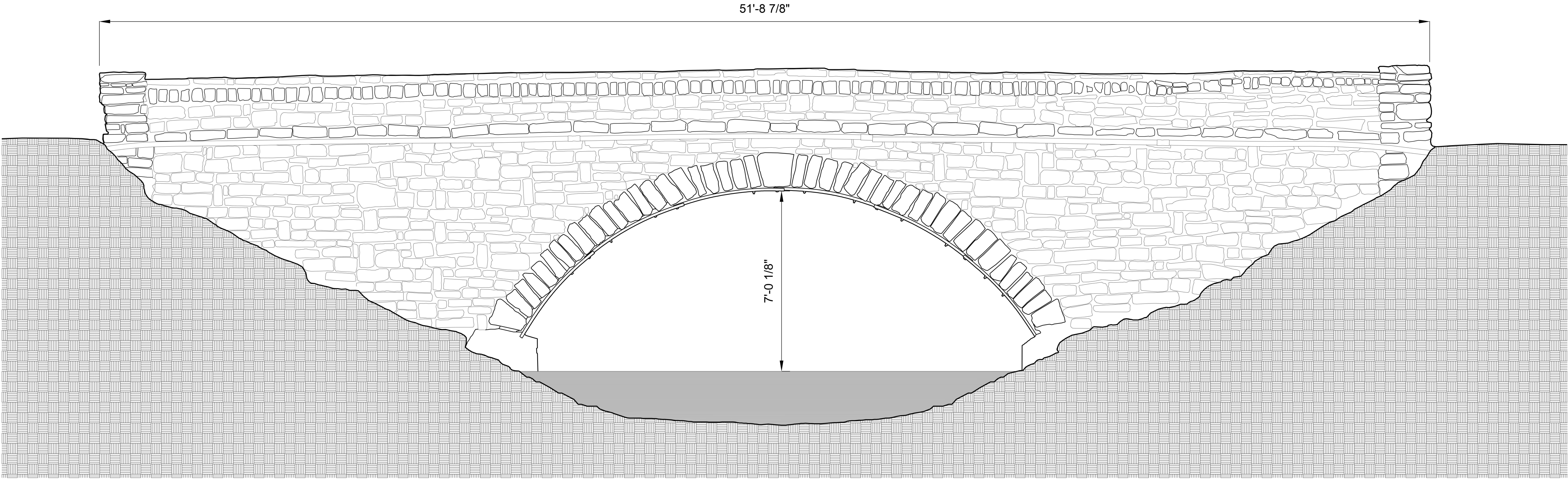
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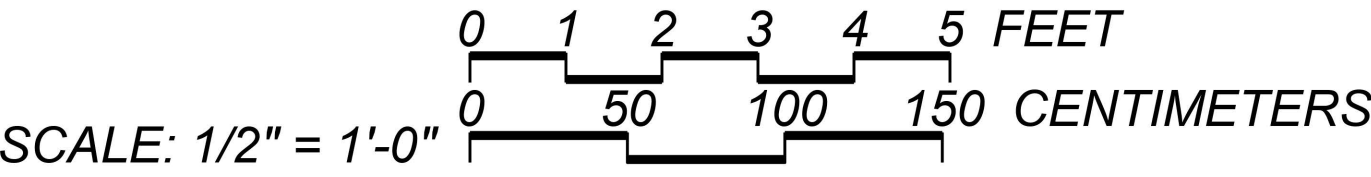


NORTH ELEVATION



SOUTH ELEVATION

EXTERIOR ELEVATIONS
SCALE: 1/2"=1'-0"



DELINEATED BY: JEREMY MAURO, JOHN WACHTEL, JOCELYN BELMONTE 2016

STONE BRIDGE
RECORDING PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

STONE BRIDGE
CSAH 17 SPANNING GRAND PORTAGE CREEK
COOK COUNTY

GRAND PORTAGE

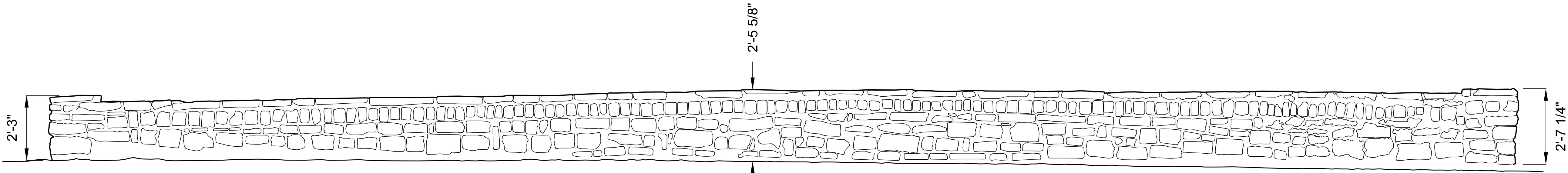
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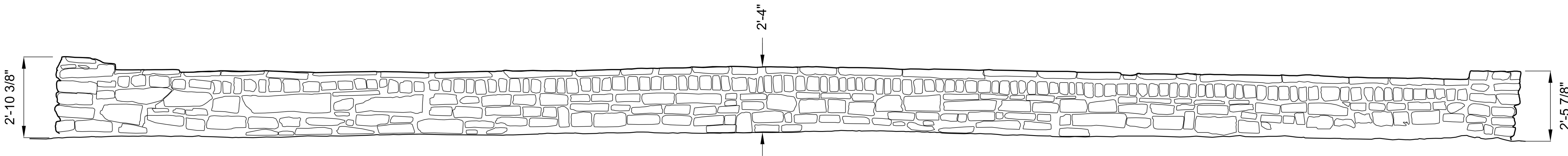
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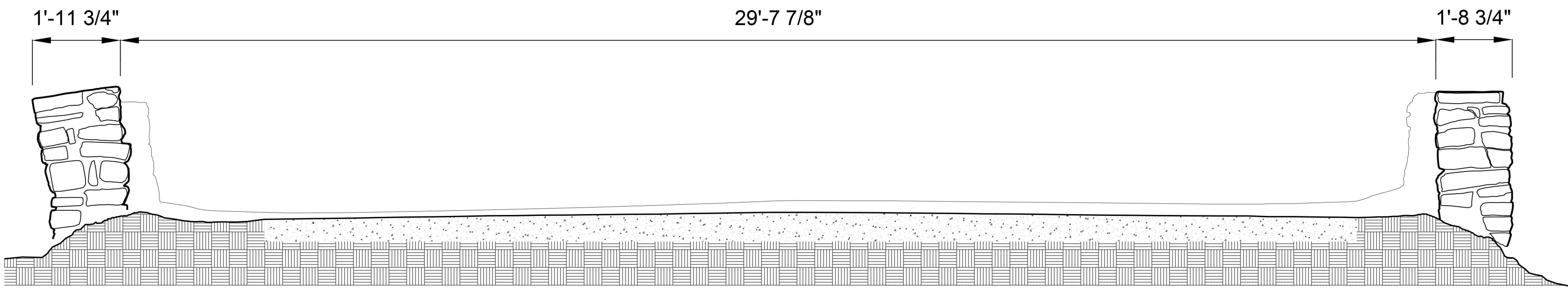
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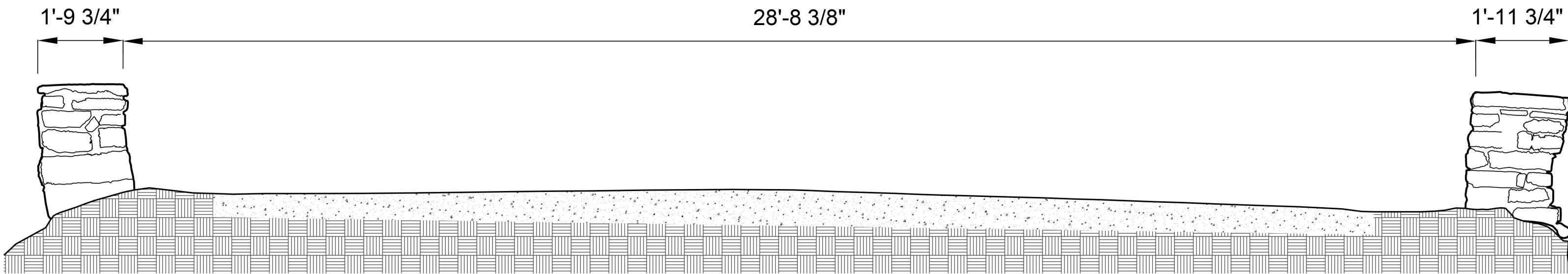
NORTH INTERIOR PARAPET WALL



SOUTH INTERIOR PARAPET WALL



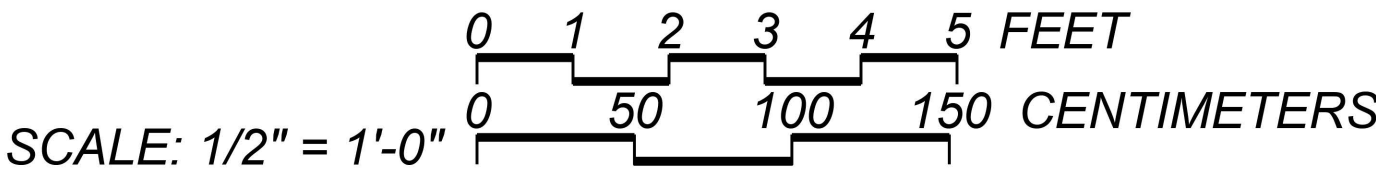
WEST APPROACH



EAST APPROACH

PARAPET WALL ELEVATIONS

SCALE: 1/2"=1'-0"



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STONE BRIDGE
RECORDING PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

GRAND PORTAGE

STONE BRIDGE
CSAH 17 SPANNING GRAND PORTAGE CREEK
COOK COUNTY

MINNESOTA

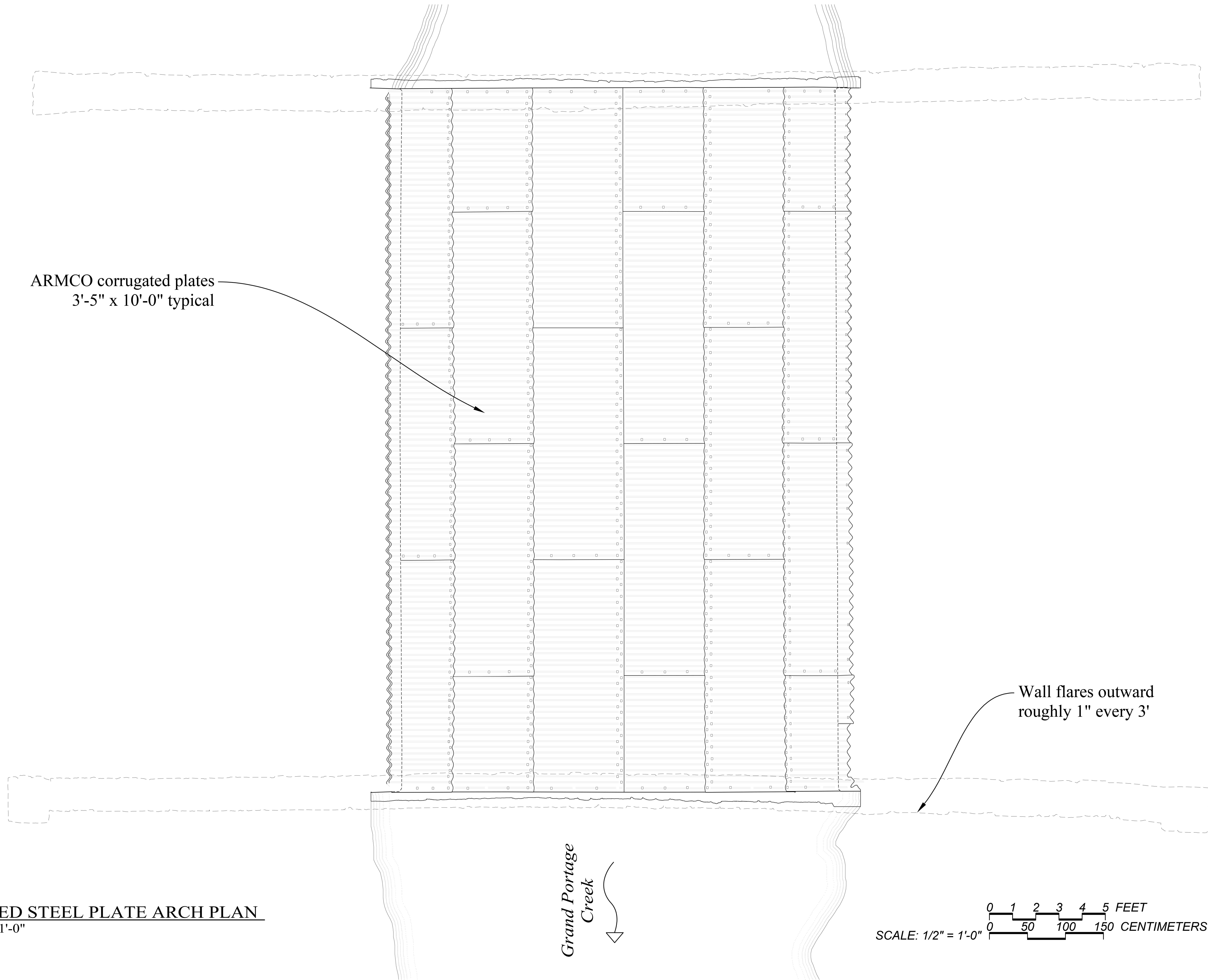
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REFLECTED STEEL PLATE ARCH PLAN
SCALE: 1/2"=1'-0"



DELINEATED BY: JOCELYN BELMONTE, JOHN WACHTEL, 2016

STONE BRIDGE
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NATIONAL PARK SERVICE
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GRAND PORTAGE

STONE BRIDGE
CSAH 17 SPANNING GRAND PORTAGE CREEK
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