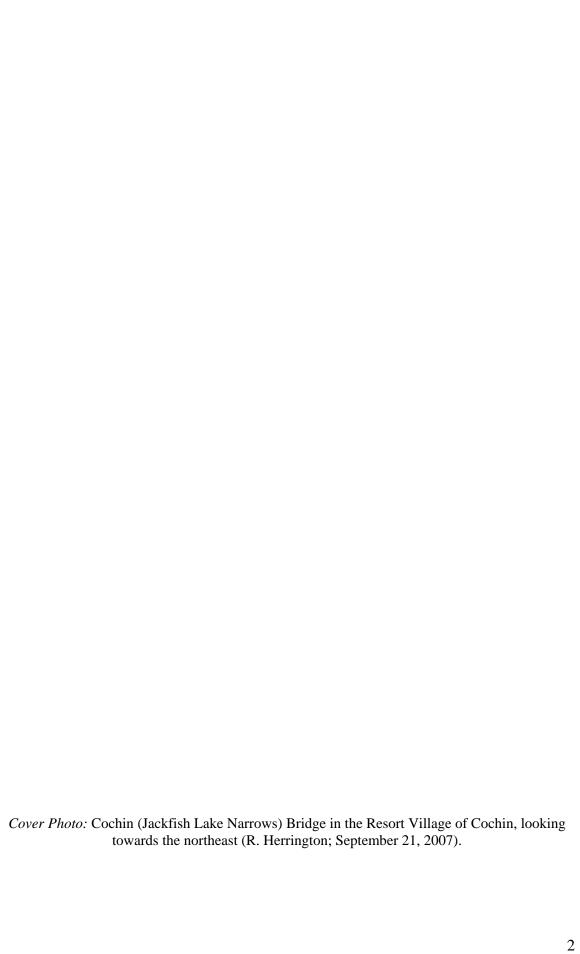
Statement of Heritage Significance

Cochin (Jackfish Lake Narrows) Bridge R.M. of Meota No. 468



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STATEMENT OF SIGNIFICANCE

Cochin Bridge is located in the Resort Village of Cochin. It crosses Lehman Creek which is a channel that connects Jackfish Lake to Murray Lake. The structure, which was completed in July, 1926, is a reinforced concrete, double-span bowstring or rainbow arch bridge on concrete abutments. The bridge is also referred to as the "Jackfish Lake Narrows Bridge".

HERITAGE VALUE

The heritage value of the bridge lies in its status as a distinctive feature and an important community landmark within the recreational lakes area of northwestern Saskatchewan. The graceful reinforced concrete bowstring arches contrast with the more utilitarian bridges commonly constructed throughout Saskatchewan prior to the 1920s. While the bridge has been restricted to pedestrian traffic since June, 1989, the structure remains largely unchanged since its completion in 1926.

The heritage value of the structure also resides in its engineering technology. Reinforced concrete bowstring or rainbow tied-arch structures became prevalent throughout southern Saskatchewan in the 1920s and 1930s, with about ninety of these being constructed during this period. The permanence of these arch bridges contributed significantly to the improvement of Saskatchewan's provincial road network. The double-span rainbow bridge at Cochin is a visible representative example of Saskatchewan's early experiments with reinforced concrete bridge designs.

CHARACTER-DEFINING ELEMENTS

The heritage value of the Cochin Bridge resides in the following character-defining elements:

- those elements which speak to its status as a landmark in the community, including its form and massing and its location on its original site;
- those elements that reflect the property's engineering technology, such as the reinforced concrete tied-arches, abutments, vertical hangers, and parapets.

ADDITIONAL INFORMATION

A. Historical Significance

The first bridge over Jackfish Lake Narrows (Lehman Creek) was completed in 1902.¹ This was a timber structure comprised of six 20-foot spans on wooden piles. This was dismantled in the summer of 1926 when the present double-span reinforced concrete bowstring arch bridge was constructed immediately to the east of the old timber structure.² The total length of the bridge is 127 feet and the width 22 feet.

The call for tenders for construction of this bridge was advertised in both the Regina *Leader* and Saskatoon *Phoenix* newspapers in late March and early April of 1926, and an experienced concrete contractor, John Kenward of Regina, was subsequently awarded the contract. Kenward had constructed as many as ten of these single-span and double-span reinforced concrete bowstring arch bridges in Saskatchewan from 1922 to 1925, prior to taking on the work at Cochin. He was the contractor on five similar bridges in 1926 and sixteen more from 1928 to 1930, including the longest single-span (110 feet) bowstring arch bridge over the Souris River in 1929. Unfortunately, the quality of the work he did on the Cochin bridge was less than ideal.

An inspection by Highways officials on August 3, 1926, presumably shortly after completion of the bridge, found the bridge to be "one of the poorest that contractor John Kenward has given us in some time". The poor concrete finishing and poor joints were "evidence of [the work] having been done too carelessly." Kenward's work was also criticized in July of 1936 when a subsequent inspection by Saskatchewan Highways noted that he had still to cut off the 60 wooden stubs from the old piles.

The bridge provided the main access point across Highway #4 at the Resort Village of Cochin for both vehicles and pedestrians until the highway was re-aligned and the bridge replaced by the present structure in 1962. This was a much-needed upgrade but local officials and residents were quick to express their concerns about the safety of pedestrians who shared the old bridge with traffic. For example, in the summer of 1950, the local MLA suggested to the province that a sidewalk be added on the outside of the arches. The province acknowledged the safety issue but responded that this addition would be expensive and, in their view, unsightly. They suggested that the following sign be erected: "Danger! Beware of Pedestrians on Bridge. Drive Slowly."

By 1960, the poor horizontal alignment of the highway through the bridge prompted discussions about closing this bridge to vehicular traffic and replacing it with another structure. The bridge subsequently was replaced in 1962 although the bowstring arch bridge continued to be used for local vehicles weighing less than 3 tonnes. By this time the bridge superstructure was showing considerable deterioration of the concrete.

In June 1989, the Village of Cochin agreed to close the old bridge across Lehman Creek, and restrict its use to pedestrian traffic. At the same time, they stressed the need for a pedestrian crossing and suggested that the province construct a new footbridge, should

the bridge become unsafe. The Bridge Branch was instructed to determine what engineering works should be undertaken to help preserve the appearance of this bridge. ⁵ A subsequent inspection indicated that it would cost between \$80 000 to \$100 000 to repair twenty panels. ⁶

B. Engineering Significance

James Barney Marsh was the chief engineer and owner of the Marsh Bridge Company (later the Marsh Engineering Company) which was founded in 1904 in Des Moines, Iowa. Marsh's engineering career focused on reinforced concrete structures. By 1910 he had developed two types of reinforced concrete through arches which reflected his philosophy that structures should be economical and aesthetically-pleasing. The first of the "Marsh Arches", as they became known, consisted of arch ribs that were connected directly to the abutment. The floor or road deck was suspended from each arch ring by vertical hangers. The second design became known as a 'bowstring' or 'tied-arch' bridge. In this design, the arch ring and deck functioned as a continuous, integrated unit. The road deck "contained the ring's horizontal thrust action, eliminating the need for heavily reinforced piers. Instead, the tied arch rested on lightly constructed piers that did not require solid rock foundations. This design was popular at sites with shallow, sandy streambeds."

The 80-foot Middle Road Bridge, constructed over Etobicoke Creek near Long Branch, Ontario in 1909, was the first reinforced concrete parabolic bowstring truss bridge constructed in Canada. This was designed by the engineering firm of Frank Barber and C.W. Young and may have been based on Marsh's arch designs. The bridge included a concrete compression arch above the roadway that was tied to the road bed. Vertical tension members from the arches supported the deck. Diagonals were used to stiffen the arch against distortion, thus, structurally being similar to a steel truss. After this success, reinforced concrete bridges, especially those on municipal roads, became widely used throughout Canada.

The "first pure bowstring...tied arch, constructed of concrete in Canada was that at Riverview, Manitoba." Built in 1917, at 86.5 feet it was the longest of any tied-arch in America at the time. ¹²

In spite of this early success, however, it was several years before this design appeared in Saskatchewan, when a bowstring truss bridge was completed in early 1920 over Wascana Creek in southeast Regina at the historic McKell's Crossing. This bridge is still actively used. This design was superceded by the reinforced concrete bowstring tied-arch. In Saskatchewan, this type of structure is often referred to as a "suspended floor" arch bridge.

The first reinforced concrete bowstring tied-arch bridge erected in the province was constructed in 1921 over Bone Creek south of Tompkins in the R.M. of Carmichael No. 109. It was a 60-foot span and replaced an older pile bent structure 15 but has since been replaced by two large culverts. This type of structure became popular for smaller

crossings until the late 1930s. Multiple-arch bowstring bridges were erected at several longer crossings throughout the province.

Reinforced concrete arch bridges were designed as a viable alternative to the standard steel truss on concrete abutments commonly in use in Saskatchewan at the time. This type of arch bridge was well-adapted to crossings where low banks existed, such as in many prairie streams, and provided a larger clearance compared to an earth-filled concrete arch or concrete beam bridge. The cost was comparable and the design had the added advantages of low maintenance costs and a more aesthetically-pleasing structure. Beginning in early 1921, the Department of Highways drafted standardized plans for spans of 40, 50, 60, 70, 84, and 110 feet.

Reinforced concrete bowstring tied-arch structures became prevalent throughout southern Saskatchewan between 1921 and the 1930s, with about ninety of these being constructed (almost half of these in the 1930s). These arch bridges contributed significantly to the improvement of Saskatchewan's provincial road network and their "permanence indicates the determination of the provincial administration to establish a good transportation system." Several of these distinctive bridges still exist in Saskatchewan although they have often been abandoned by new highway alignments since their construction did not permit widening of the roads to meet changing highway traffic needs. The double-span rainbow bridge at Cochin is a visible representative example of Saskatchewan's early experiments with reinforced concrete bridge designs.

¹ Bridge Services plan #847 dated July 20, 1901.

² Bridge Services plan #1135 (no date); 30-47-16 W3.

³ Saskatchewan Highways and Transportation, Bridge Services File 316-47-30B.

⁴ Memo on Bridgefile 316-47-30B dated June 28, 1950.

⁵ Memo on Bridgefile 316-47-30B dated June 23, 1989.

⁶ Memo on Bridgefile 316-47-30B dated April 29, 1991.

⁷ Elegant Arches, Soaring Spans: C.B. McCullough, Oregon's Master Bridge Builder, Robert W. Hadlow, 2001, Oregon State University Press, p.18.

⁸ This structure was similar to the iron bowstring arch bridges in use in the late 1800s.

⁹ Elegant Arches, Soaring Spans: C.B. McCullough, Oregon's Master Bridge Builder, Robert W. Hadlow, 2001, Oregon State University Press, p.19.

¹⁰ "Bridge Building", C.R. Young, *The Engineering Journal*, Vol. 20, June 1937, p.494.

¹¹ Frank Barber would design and supervise the construction of over 500 bridges throughout southern Ontario.

¹² "Bridge Building", C.R. Young, *The Engineering Journal*, Vol. 20, June 1937, p.494.

¹³ The Public Service Monthly, Vol. VIII, No.9, Regina, April 1920, p.1.

¹⁴ It is believed that this was the only reinforced concrete <u>truss</u> bridge constructed in Saskatchewan.

¹⁵ Annual Report of the Department of Highways for 1921-22, p.28.

¹⁶ "The Borden Bridge: An Assessment of Heritage Significance", unpublished manuscript prepared for the Borden Library Board by David Neufeld, 1984, p.4.