Statement of Heritage Significance

University (25th Street) Bridge
Saskatoon

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Cover Photo: Saskatoon's University Bridge looking towards the east (R. Herrington; September 19, 2007)

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STATEMENT OF SIGNIFICANCE

The University Bridge, located in Saskatoon, connects 25th Street on the west side of the South Saskatchewan River with College Drive and Clarence Avenue on the east side. The bridge, which was opened officially on November 15, 1916, is a reinforced concrete, open spandrel deck arch structure consisting of ten arches which increase in span from 25 to 150 feet from west to east.

HERITAGE VALUE

The heritage value of the bridge lies in its status as a prominent feature of Saskatoon's urban landscape and an important community landmark. This structure was Saskatoon's second vehicle bridge. Except for a major rehabilitation in the late 1990s, and the installation of new pedestrian guard rails, the superstructure remains largely unchanged in appearance. The bridge has been in continual use by vehicles and pedestrians since its completion in 1916.

The heritage value of the structure also resides in the use of innovative technology. The bridge was the first reinforced concrete, open spandrel deck arch structure built in Western Canada and had the longest spans of any such bridge in the country at the time of its construction. The flat, semi-elliptical arch design was patented by American bridge engineer, Daniel B. Luten in 1905. Luten acted as engineering consultant to the Board of Highway Commissioners on the University Bridge (25th Street) project. The bridge is one of the earliest surviving examples of Luten's design philosophy in Canada.

The heritage value of the bridge is also connected to 1916 Wetmore Royal Commission to investigate allegations of impropriety in awarding the University Bridge contract and misallocation of funds for road contracts. The Royal Commission recommended changes in the management process for the province's roads. On April 1, 1917 the Board of Highways Commissioners was replaced by the Department of Highways as a regular government department.

CHARACTER-DEFINING ELEMENTS

The heritage value of the University 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 which reflect the property's innovative engineering technology including the reinforced concrete, open spandrel deck arch structure .

ADDITIONAL INFORMATION

A. Historical Significance

In 1906, Saskatoon's population was officially 3011; within five years it had almost quadrupled to 12,004.[1] The 1907 narrow steel Traffic Bridge had quickly become inadequate to support this rapid population expansion and growth in traffic. The selection of Saskatoon as the home of the provincial university, as well as the growth of the Town of Sutherland and the expansion of the residential sector north of the Nutana area also heightened the demand for a second crossing of the river. Construction of university buildings began in the spring of 1910 and the first classes were offered in the fall of 1912.

A letter dated December 6, 1910, from F. Maclure Sclanders, Saskatoon Board of Trade Commissioner, to the Mayor of Saskatoon suggested that "the time is now ripe for a definite taking up [of the matter of a traffic attachment to the CPR Bridge] with the Canadian Pacific Railway Company."[2] While this proposal was not successful, it does highlight the need for vehicular access to the rapidly growing community of Sutherland and better communication with the new University. Also actively promoting a new bridge during this period was Saskatoon's member of the provincial legislature, the Hon. Archibald Peter McNab. McNab won the Saskatoon Riding in the August 14, 1908 General Election. He was the Minister of Municipal Affairs from May 1910 to Aug, 1912, and then the Minister of Public Works to 1926. Responsibility for roads and bridges generally fell under the Department of Public Works at this time until the creation of the Department of Highways in 1917. McNab, well-placed to promote the interests of Saskatoon, "urged upon the government the importance of a new and larger bridge. He pointed out the advisability of early action and his request was acceded to."[3]

In early 1912, the provincial Department of Public Works sent bridge engineer, C.P. Richards, to Saskatoon to report on the question of a new traffic bridge. Richards presented his report[4] in March, 1912 to the Department of Public Works that recommended the site that was eventually chosen.[5]

The Saskatchewan Board of Highway Commissioners was formed in early 1912 to oversee the construction of large provincial bridge projects. The Chairman, Archibald J. McPherson,[6] Commissioners, and the Deputy Minister for Public Works, Charles Dill, met with local municipal officials in late June, 1912. The meeting also included Professor Alexander Roger Greig of the University, who was Professor of Mechanical Engineering (1909 to 1937) and Superintendent of Buildings (1909 to 1939)[7] and also a member of the Board of Highway Commissioners. The group "studied the proposed site of the bridge between the end of 25th Street and the southwest corner of the University property and reviewed the initial bridge design."[8] "All present at this conference were agreed that only a wide bridge would be adequate for future requirements."[9]

By September 1912, the City of Saskatoon Board of Works Committee had recommended to City Council "That the provincial Government be requested to take

immediate action in regard to the constructing of a new Traffic Bridge across the River at 25th Street."[10]

While discussions were in progress with the province regarding a 25th Street bridge, the City was considering other traffic bridge options across the South Saskatchewan River. In September 1912, the Board of Works was instructed by City Council "to obtain estimates of the cost of constructing a Traffic Bridge across the River opposite First Avenue and McPherson Avenue and also of a new Bridge at the location of the present [steel] one."[11] Once the decision was made to proceed with the University crossing, these options were not pursued further.

The province and the city signed an Agreement on February 11, 1913 to construct the bridge connecting 25th Street and the University property, at a "location to be hereinafter definitely determined by survey."[12] The city agreed to pay one-third of the total cost of construction and to seek approval from ratepayers to borrow $100 000 towards the city's share of this cost. The ratepayers subsequently approved the issuing of a bylaw to confirm this Agreement and By-Law No. 649 was passed by Council on May 19, 1913.

The contractor, the R.J. Lecky Company of Regina, had been awarded the contract on July 15, 1913 but delays were experienced in starting the project. The first President of the University of Saskatchewan, Walter Charles Murray, turned the first sod on August 28, 1913.[13] Construction finally commenced on September 2, 1913 and by early December of that year Lecky had completed one concrete pier and excavated four others, as well as completing one retaining wall and one pedestal. This led to some discussion at the time "as to the class of statue to be placed upon it [the pedestal]."[14] It is not known exactly where the pedestal was located and whether there were more than one, but no evidence exists that any statues were in fact installed. It is interesting that the preliminary plan dated December, 1912 shows a fountain or similar structure at the intersection of Spadina Crescent and 25th Street which would have made traffic curve around this structure. As far as is known, this fountain was never constructed.

On December 13, 1913 "a representative [from Daniel Luten's Minneapolis office] of the Consulting Engineer visited the work and expressed his approval of the foundations and of the concrete in place at that time."[15]

Due to the extremely late freeze-up of the river and difficulty with coffer dams,[16] the contractor was unable to complete all the piers during the winter of 1913-1914, which seriously delayed progress on the bridge. By April, 1914, eight piers, and the west abutments and retaining wall had been completed. The remaining piers were poured in 1914 but unfortunately, the concrete in part of one "failed to take a proper set and it was necessary to remove the faulty material." This caused further delays and left the contractor "barely time to finish out his arch rings before the cold weather closed down the season of 1914."[17] Failure to complete this stage of the structure before the spring runoff might have jeopardized the entire project. This left the superstructure and roadway paving to be completed in 1915.

Concerns in the early summer of 1915 from the Saskatoon Trades and Labour Council about the delay in completing the project prompted the provincial government, through the Hon. A.P. McNab, to issue instructions to re-start the construction work.[18] Work on the floor system started in May, 1915 and with the exception of the roadway paving, the bridge was completed in November 1915.[19]

The financial burden on the City of Saskatoon from constructing the University Bridge was substantial. In May 1916 the city decided to save money by not paving it and laying the streetcar tracks, although the rails had been purchased. The bridge remained unfinished until the provincial government offered to finance its completion. The double track was installed on the bridge in September but streetcars never crossed the river on this structure, since tracks were not laid along 25th Street to join those on the bridge. The tracks were removed from the bridge in 1947.[20]

The official opening and dedication of the University Bridge was held on November 15, 1916.[21] Premier Martin and Saskatoon Mayor Young joined other dignitaries at the ceremony. This was a relatively low-key event which clearly was overshadowed by the war in Europe and the Wetmore Royal Commission which was investigating irregularities in the University Bridge contract and broader fraudulent activities related to highway contracts issued under the Board of Highway Commissioners.

Unfortunately, the decision to start the bridge in 1913 presented some major challenges. This was partly because the project was initiated during the pre-war boom period. The collapse of the economy by the end of 1913, followed by the withdrawal of British investment capital after war was declared in August, 1914, meant the contractor, like many others at the time, faced bankruptcy. And to make matters worse, the provincial government froze all its contracts in 1914, although the government was forced to allow Lecky to complete the arch rings to ensure that runoff in the spring of 1915 would not endanger the completed work.

In the late 1960s, Saskatoon considered demolishing the bridge due to major concerns over the decking. A new downstream bridge was proposed but the estimated cost was excessive. Beginning in April, 1998 the historic structure underwent a major renovation with arches, railings and sidewalks being rebuilt.

Although known initially as the 25th Street Traffic Bridge, or just the 25th Street Bridge, on October 4, 1915 the City Council considered a recommendation of the Board of Highway Commissioners that a nameplate[22] be inscribed and attached to the bridge with these words: “University Bridge, built by the Board of Highway Commissioners, Province of Saskatchewan, 1913-1915, one-third of the cost contributed by the City of Saskatoon”.[23] Council referred the wording to the City Commissioners but no documentation exists that finalizes a name for the structure.[24] The bridge remained without an official name until January 1, 2006 when the City of Saskatoon officially named the structure the ‘University Bridge’.

B. Engineering Significance

From an engineering perspective, the site selected by the city presented some challenges. These included the width of the river at this point (about 1100 feet) and the 50-foot difference in height between the west and east banks. Also, "Special care had to be exercised from an aesthetic standpoint, for the bridge was to cross from a park on the east [actually west] side to the University grounds on the opposite side of the river."[25]

Preliminary designs for two radically different types of structures were prepared under the direction of the Board of Highway Commissioners: a traditional steel through-truss superstructure on concrete piers; and, a more innovative reinforced concrete open-spandrel deck arch bridge.[26] The engineers recognized that the traditional steel through-truss would have required a level deck. This would have necessitated an approach on the west side about a block in length to address the steep grade from one bank to the other. The city was concerned that this long grade would negatively impact the existing houses and City Park along the approach as well as have an unsightly appearance. This likely would have required compensation by the city.[27] The reinforced concrete arch structure would eliminate these concerns. In addition, the arch structure would only have added about $6000 to the total project cost.[28]

Not all the engineering staff, however, were convinced that a concrete bridge at the proposed site was the best solution. For example, on June 26, 1912 Engineer C.W. Dill submitted a report that recommended a level steel bridge.[29]

The bridge was designed by Adam P. Linton, who was hired in April, 1912 as the Assistant Chief Engineer of the Bridge and Ferry Branch of the Saskatchewan Department of Public Works. The final design was approved by A. J. McPherson, the Chairman of the Board of Highway Commissioners. The Board was formed in early 1912 by Order-in-Council and existed until April 1, 1917, when the Saskatchewan Department of Highways was formed.[30] During these years, the Board was responsible for the construction of steel bridges on concrete foundations whereas the "Public Works Department retained the work in connection with the construction of timber bridges and steel bridges on timber abutments."[31]

A prominent American engineer, Daniel B. Luten,[32] was engaged as the external bridge consultant for the project. He was an 1894 graduate of the University of Michigan and subsequently taught at Michigan and Purdue University until 1900. Luten then entered private practice in Indianapolis as a bridge designer. By 1911 he had become recognized as one of the prominent reinforced concrete arch bridge designers in North America. He and his various companies, such as the National Bridge Company and the Luten Bridge Company, designed and constructed thousands of RC arch bridges throughout virtually every American state, although these were primarily in the east and mid-west, as well as in Mexico and Canada. By 1915 Luten held more 39 patents related to bridges, including the semi-elliptical arch design used in the University Bridge.[33]

Adam Linton and his staff apparently designed a half-dozen different types of reinforced concrete arch bridges to arrive at the most economical design.[34] A.J. McPherson subsequently met with the consultant, Daniel Luten, in Indianapolis who "advised that [the proposed design] would be very well adapted" to the difficult site.[35]

The 65-foot width of the bridge was designed to accommodate two central street car tracks, two 14-foot roadways and two 8-foot sidewalks which were cantilevered from the roadway. The variation in span of the ten arches from 25 feet at the west end to 150 feet towards the east created a visual impression of "a stone skipping across water."

The 150-foot arches at the east end of the bridge were at the time the longest such spans in Canada,[36] and the entire bridge was the longest of its type in the country.[37] Built in 1910, the Wadsworth Bridge at Weston, Ontario which was designed by Barber and Young, appears to have been the first open-spandrel reinforced concrete arch bridge in Canada.[38] At 118.5 feet it was probably the longest span at the time. Saskatoon's University Bridge may have been the first one designed with the assistance of Daniel B. Luten.[39]

In July 1913, the Board of Highway Commissioners called for tenders. Three contractors submitted bids: The R.J. Lecky Company; F.J. Robinson & Company; and, Parsons Construction and Engineering Company. In addition to bidding on the design as proposed by the Board, Parsons submitted a second bid based on the "Kahn" method of reinforced concrete. This system used specially designed reinforcing steel that reduced the amount of concrete needed. The Board considered that the Kahn system was not economical, but perhaps more importantly, Saskatoon was anxious to start construction that summer and the city indicated to the Board that "It would take four or five months to get out new plans and specifications for construction of the bridge on the Kahn System of reinforcing, and rather than cause this delay it is considered advisable to adhere to the original plans."[40]

The R.J. Lecky Company was awarded the contract as the lowest bidder. But misfortune was to follow Lecky on this project. Problems were encountered in completing some of the piers on schedule due to difficulties with coffer dams. A poor concrete mix on one pier resulted in another serious delay in construction while experts were consulted and the unacceptable concrete was removed and replaced. The priorities of the First World War was an additional impediment to completing the project on time.

In the summer of 1914 Lecky leased a "MacMichael Pneumatic Mixer."[41] This innovative technology had been patented the previous year and offered efficiencies in mixing and transporting concrete to the site.

To avoid the possibility that Lecky would declare bankruptcy and the bridge not get completed, the government appointed a trustee for Lecky's contract. On January 1, 1916 the government released Lecky from his contract and took over the remaining work on the bridge.

In February 1916, J.E. Bradshaw, the Conservative member for Prince Albert, brought forth allegations of impropriety by the Board of Highway Commissioners. Specifically, he suggested there was a misallocation of funds for road contracts and that the Chairman of the Board of Highway Commissioners, A.J. McPherson, held majority shares in the R.J. Lecky Company. This led to the Liberal government appointing the Wetmore Royal Commission to investigate. The Commission addressed three questions: Was the bridge over-priced? Did McPherson profit from his hidden connection to the Lecky Company? And, was the Board of Highway Commissioners an effective way of supervising road and bridge construction?

On the first question, testimony concluded that the bridge had been well-designed and constructed, and had resulted in good value for the investment. Secondly, while it was determined that McPherson had not profited directly from the University Bridge contract, he was censured for his lack of professional judgment. Finally, the Royal Commission recommended changes in the management process for the province's roads. On April 1, 1917 the Board of Highways Commissioners was replaced by the Department of Highways as a regular government department.

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[1] Federal Census Statistics via City of Saskatoon, Municipal Manual, 2003, p.83.
[2] Saskatoon Board of Trade minutes for 1910, Correspondence File D500-IV-533.
[3] *The Saskatoon Phoenix*, 'Harvest' Issue, December 4, 1913, p.5.
[4] A copy of this report has not been located to date.
[5] Wetmore Royal Commission, Saskatoon Bridge Contract, Volume 1 of the Evidence, p.12.
[6] A.J. McPherson, B.A.Sc., was the Assistant Chief Engineer. Prior to joining the Department, he was involved with the 'good roads' movement in Ontario. McPherson became Superintendent of Highways in 1908 and then Chairman of the Board of Highway Commissioners in 1912. He resigned in January 1914 and was replaced by F.J. Robinson.
[7] http://www.usask.ca/archives/history/Essays2006_Morton.pdf
[8] D. Neufeld Consulting & Research, *Heritage Bridges of Saskatoon*, draft manuscript, 1985, p.101.
[9] *The Saskatoon Phoenix*, 'Harvest' Issue, December 4, 1913, p.5.
[10] September 23, 1912 Saskatoon Council Minutes, Board of Works Committee Report, Reference 1740.
[11] Minutes of Saskatoon Council Meeting, September 23, 1912.
[12] A preliminary design of the bridge formed part of the February 11, 1913 Agreement.
[13] *The Morning Leader*, Regina, Friday, August 29, 1913, p.1.
[14] *The Saskatoon Phoenix*, 'Harvest' Issue, December 4, 1913, p.5.
[15] Annual Report of the City Engineer, 1913, p.2 (City of Saskatoon Archives, 1050-04).
[16] Annual Report of the City Engineer, 1914, p.4 (City of Saskatoon Archives, 1050-05).
[17] Annual Report of the Board of Highway Commissioners, for Fiscal Year ending April 30, 1915, p.36.
[18] *The Saskatoon Phoenix*, May 13, 1915, p.3.
[19] Annual Report of the Board of Highway Commissioners, for Fiscal Year ending April 30, 1916, p.41.
[20] Wayman, Easten, Saskatoon's Electric Transit: The Story of Saskatoon's Streetcars and Trolley Buses, Railfare Enterprises Ltd., Hawkesbury (Ontario), 1988, p.20.
[21] *The Saskatoon Phoenix*, November 16, 1916, p.3.
[22] The word 'inscribed' suggests that a real nameplate or plaque might have been submitted rather than just the text. If such existed, its whereabouts is unknown.
[23] *The Saskatoon Phoenix*, October 2, 1915, p.3.
[24] Personal Communication with Jeff O'Brien, City of Saskatoon Archivist, November 2, 2007.
[25] *The Saskatoon Phoenix*, 'Harvest' Issue, December 4, 1913, p.5.
[26] *The Saskatoon Phoenix*, 'Harvest' Issue, December 4, 1913, p.5.

[27] Wetmore Royal Commission, Saskatoon Bridge Contract, Volume 1 of the Evidence, p.13-14.
[28] *The Saskatoon Phoenix*, 'Harvest' Issue, December 4, 1913, p.5.
[29] Wetmore Royal Commission, Saskatoon Bridge Contract, Volume 1 of the Evidence, p.20.
[30] Annual Report of the Board of Highway Commissioners, for Fiscal Year ending April 30, 1917, p.7.
[31] Annual Report of the Department of Public Works, for Fiscal Year ending February 28, 1913, p.8.
[32] *The Saskatoon Phoenix*, 'Harvest' Issue, December 4, 1913, p.5.
[33] Artistry and Ingenuity in Artificial Stone: Indiana's Concrete Bridges, 1900-1942, James L. Cooper, De Pauw University, 1997, p.65.
[34] Wetmore Royal Commission, Saskatoon Bridge Contract, Volume 1 of the Evidence, p.15.
[35] Wetmore Royal Commission, Saskatoon Bridge Contract, Volume 1 of the Evidence, p.19.
[36] "Concrete Arch Bridge at Saskatoon", *Engineering News*, 73 (9), March 4, 1915, p.434. See also: "New Highway Bridge at Saskatoon, Sask.", *The Canadian Engineer*, Vol. 28, March 18, 1915, pp.351-353.
[37] The Centre Street Bridge in Calgary, although not as long as Saskatoon's University Bridge, was completed in 1918.
[38] "Bridge Building", C.R. Young, *The Engineering Journal*, Vol. 20, June 1937, p.492.
[39] The author has consulted with several prominent Canadian and American bridge historians; no one is aware of earlier Canadian bridges on which Daniel B. Luten was the engineering consultant.
[40] Correspondence between the City Clerk and A.J. McPherson, August 1, 1913, City of Saskatoon Archives.
[41] D. Neufeld Consulting & Research, *Heritage Bridges of Saskatoon*, draft manuscript, 1985, p.114.