



Postcard, ca. 1930 (Minnesota Historical Society)

**FORD MOTOR COMPANY TWIN CITIES ASSEMBLY PLANT:
AN ASSESSMENT OF SIGNIFICANCE AND ELIGIBILITY**

**966 SOUTH MISSISSIPPI RIVER BOULEVARD
SAINT PAUL, RAMSEY COUNTY, MINNESOTA**

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NOVEMBER 2007

TABLE OF CONTENTS

INTRODUCTION	1
METHODOLOGY	1
CRITERIA FOR HISTORIC DESIGNATION	2
HISTORICAL CONTEXT	
Ford Motor Company Branch Assembly Plants	3
Main Assembly Plant.....	6
Hydroelectric and Steam Plants	8
Accessory Buildings, Structures, and Objects	9
Changes at the Twin Cities Assembly Plants	10
FINDINGS	
Areas of Significance.....	14
Assessment of Integrity.....	17
CONCLUSION	20
SOURCES CONSULTED	21
APPENDIX	
Site Plan	24

INTRODUCTION

In June 2007, the Ford Motor Land Development Corporation (Ford Land), the real estate arm of Ford Motor Company, retained Hess, Roise and Company to evaluate the historical significance of the Twin Cities Assembly Plant (often referred to as TCAP) at 966 South Mississippi River Boulevard in Saint Paul, Minnesota. This evaluation was triggered by the planned closure of the plant in 2009 and the pending sale of the Ford property, including the assembly plant, associated buildings, and surrounding land.

Hess Roise was familiar with the property, having evaluated the facility's hydroelectric plant in May 2001 as part of that facility's relicensing by the Federal Energy Regulatory Commission. That report concluded that the dam and the hydroelectric plant are eligible for listing in the National Register of Historic Places, with the assessment based primarily in the context of hydroelectric power development on the Mississippi River and the civic rivalry between Minneapolis and Saint Paul. While the plant was constructed by the Ford Motor Company to provide power for its branch factory, the company's association with the building's design and operation was not evaluated by the 2001 report.¹

Since the hydroelectric plant already has been determined eligible for historic designation, the current study has focused on analyzing the historical significance of the remaining buildings and structures on the property. The following report includes an illustrated narrative history of the development of the plant, laying the groundwork for evaluating the resources. The physical characteristics and integrity of the elements are summarized and the historical significance of individual resources and the property as a whole are assessed.

Charlene Roise, president of Hess Roise, served as the study's principal investigator. Erin Hanafin Berg conducted the research and fieldwork and compiled inventory and contextual information, with the assistance of Penny Petersen. This report was written by Ms. Roise and Ms. Berg. Roger Gaudette, director of asset management, and Chris Johnson, decommissioning project manager, oversaw the project for Ford Land. Brad Bystrom was the primary Ford contact at the plant.

METHODOLOGY

Assessment of the property began with interior and exterior reconnaissance fieldwork, leading to an understanding of the physical characteristics of the plant. Primary consideration was given to components that were built between 1924, when the plant was established, and 1969, when a large addition was made to the west side of the main plant. Areas that appeared to be of historical or architectural interest were noted and additional research was conducted on these resources using visual tools including historic and aerial photographs, site plans, and maps. Elements that were constructed after 1969 were assumed not to be of historical value and were not extensively researched, but their impacts on other resources were noted. Primary written sources, including

¹ Charlene K. Roise and Elizabeth A. Gales, "Response to Additional Information Request, Ford Hydroelectric Project," FERC Project No. 362 / SHPO Project No. 2000-3518, September 2003, available at the State Historic Preservation Office, Minnesota Historical Society, Saint Paul.

documents and publications from the Ford archives that were obtained by Hess Roise during previous studies, were consulted for historical and contextual details. A narrative history of the plant was drafted using this information, as well as broader studies of the development and operations of the Ford Motor Company. Digital photographs were taken of the property to assist with assessment of the site and to illustrate this report. Historic photographs were obtained from the Minnesota Historical Society, the John R. Borchert Map Library at the University of Minnesota, and historic newspapers and other publications.

After a preliminary assessment of the property's historical integrity and significance, Hess Roise consulted with Susan Roth and Dennis Gimmestad, the National Register historian and compliance officer with the State Historic Preservation Office (SHPO), to determine whether the property is eligible for listing in the National Register. Ms. Roth and Mr. Gimmestad toured the site, reviewed the materials that had been prepared by Hess Roise, and concluded that the site does not retain sufficient integrity for historic designation. Amy Spong, historic preservation specialist with the City of Saint Paul and staff to the Saint Paul Heritage Preservation Commission, also was asked to determine whether the property met the criteria for local landmark designation. Ms. Spong concurred that the property's integrity is insufficient for historic designation. These findings are elaborated later in this report.

CRITERIA FOR HISTORIC DESIGNATION

Properties are assessed for historical significance using the criteria of the National Register of Historic Places and applicable municipal ordinances. While mainly an honorary designation, listing in the National Register or a determination of eligibility for listing requires federally funded or permitted projects to be reviewed in terms of their impacts on historic resources, as directed by Section 106 of the National Historic Preservation Act. Designation under local landmarks laws often includes protective measures including review by the heritage preservation commission of proposed alterations and demolition.

The criteria for National Register and local landmark designation are similar, but the standards for National Register evaluation are higher and more restrictive. Established by the National Historic Preservation Act of 1966, the National Register consists of properties "significant in American history, architecture, archeology, engineering, and culture." To be considered significant, a property must meet one or more of the following criteria:

- Criterion A: be associated with events important to broad patterns of history;
- Criterion B: have a significant association with the life of an important person;
- Criterion C: represent a type, period, or method of construction; or be the work of a master; or express high artistic values; or
- Criterion D: yield, or be likely to yield, information important in prehistory or history.

Typically, above-ground properties merit National Register designation based on the first three criteria; Criterion D is usually applied to archaeological sites. Properties can achieve significance on a local, state, or national level. A property may be individually eligible for listing or eligible as a contributing component of a historic district. In addition to significance, a property must

maintain physical integrity to be considered for the National Register, and must be over fifty years old unless it ranks as exceptionally important. The Twin Cities Ford plant was established in 1924 and readily meets the standard of age, but alterations and additions to the plant that have occurred since that time must be considered for their impacts on the integrity of the plant.

Criteria in the City of Saint Paul Legislative Code (Chapter 73) provide for the designation of areas, places, buildings, structures, or similar objects as heritage preservation sites. Properties merit designation under the following criteria:

1. The properties' character, interest, or value is part of the heritage or cultural characteristics of the city of Saint Paul, state of Minnesota, or the United States;
2. The properties' location is the site of a significant historic event;
3. The properties are identifiable with a person or persons who significantly contributed to the culture and development of the city of Saint Paul;
4. The properties exhibit a distinguished characteristic of an architectural or engineering specimen;
5. The properties are identifiable as the work of an architect, engineer, or master builder whose individual work has influenced the development of Saint Paul;
6. The properties embody elements of architectural or engineering design, detail, materials, or craftsmanship that represents a significant architectural or engineering innovation;
7. The properties' unique location or physical characteristic is established and familiar in the neighborhoods or communities of the city of Saint Paul.

There is no standard of age for landmark designation, and the review is generally less restrictive than for the National Register.

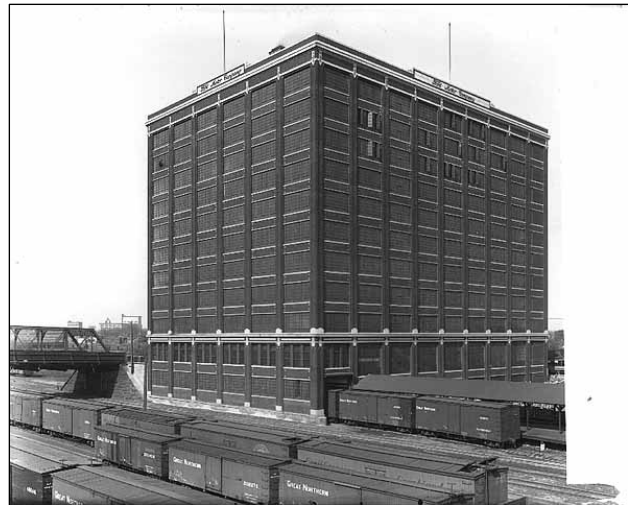
HISTORICAL CONTEXT

Ford Motor Company Branch Assembly Plants

In 1913, only one year before the Ford Motor Company completed construction of a branch plant in downtown Minneapolis, Henry Ford implemented a moving assembly line at his production facility in Highland Park, Michigan. This apparatus transferred the car through the shop, where it was put together in an orderly, continuous progression by assembly line workers, who repeatedly performed the same tasks. The moving assembly line revolutionized the automobile industry and manufacturing in general. Ford and his production engineers refined the design of the assembly line over the following years, and it was not long before the multi-level equipment employed in most of the Ford Motor Company's twenty-five U.S. branch plants—including the ten-story Minneapolis plant—was obsolete. Fewer than ten years after Ford's first assembly line was installed, the company launched a vigorous program of modernization, replacing old branch plants like the one in Minneapolis with sprawling, single-story buildings for the assembly of its popular Model "T"s.²

² Allan Nevins and Frank Ernest Hill, *Ford: Expansion and Challenge, 1915-1933* (New York: Charles Scribner's Sons, 1957), 6, 9, 255-256; Douglas Brinkley, *Wheels for the World: Henry Ford, His Company, and a Century of*

Around the same time, Henry Ford envisioned a fully integrated company where raw materials and refineries, parts production and vehicle assembly, power sources and transportation were all controlled by one entity that commanded the flow of materials and products through the entire manufacturing process. Ford acquired timber land for harvesting lumber and producing charcoal, iron mines for making steel, coal mines and hydroelectric sites for electricity, and railroads and freighters for shipping. He combined some of these components at a massive compound at the River Rouge, outside of Detroit, which was the largest integrated factory complex in the world when completed in 1928. The Rouge plant produced everything except fully finished Fords, which were put together at the nearby Highland Park plant or branch assembly plants.³



The Ford Motor Company branch assembly plant at 420-428 North Fifth Street, Minneapolis, was built in 1914-1915. (Minnesota Historical Society)

Ford also aimed to decentralize his company's manufacturing operations. He believed that doing so would result in lower costs and higher quality products while providing valuable supplemental work for agricultural families. This practice also would distribute purchasing power to relatively remote areas of the country and fuel the desire for Ford cars, trucks, and tractors. Ford set up "village industries," small-parts factories scattered along streams and rivers where they could run on available waterpower. He built small plants at rural sites along the Rouge River, and later progressed to larger factories on the Huron River in Michigan, the Miami River in Ohio, and the Hudson River in upstate New York. Ford also appreciated river transport as an inexpensive and rational alternative to railroads, which he viewed as undependable. In the early 1920s, Ford insisted that all future manufacturing and assembly plants would be built on navigable waters.⁴

With the foundation for a hydroelectric plant already in place and barge activity thriving in nearby downtown Saint Paul, the site selected for the Twin Cities Assembly Plant readily fulfilled two of Henry Ford's expansion objectives. His personal penchant for rural conservation was also satisfied, as the scenic bluff-top location was still largely undeveloped despite its proximity to two booming cities. Ford secured 167½ acres for the assembly plant through extensive negotiations with the City of Saint Paul and its business boosters on the Greater Saint

Progress (New York: Viking Press, 2003), 151-156; Carl Hennemann, "Secrecy Marked Coming of Ford Plant to Saint Paul Thirty Years Ago," *Saint Paul Pioneer Press*, June 14, 1953.

³ Nevins and Hill, *Ford: Expansion and Challenge*, 200-226, 256; Brinkley, *Wheels for the World*, 284-287; "History of the Rouge," *The Henry Ford: Ford Rouge Factory Tour*, available at <http://www.thehenryford.org/rouge/history.asp>; "River Rouge Plant," *Wikipedia*, available at http://en.wikipedia.org/wiki/River_Rouge_Plant.

⁴ Nevins and Hill, *Ford: Expansion and Challenge*, 226-230, 256.

Paul Committee. Meetings were kept secret, lest Minneapolitans hear of the plans and propose a counteroffer. On January 9, 1923, the *Pioneer Press* broke the news that Ford was coming to Saint Paul with a giant manufacturing plant.⁵

According to an article celebrating the thirtieth anniversary of the announcement, “Henry Ford got everything he asked for when he decided to build his plant in Saint Paul.” The federal government granted Ford a fifty-year license to generate power and the authorization to construct a hydroelectric plant.

The Chicago, Milwaukee, and Saint Paul Railroad extended a transcontinental freight route right to the doors of the plant. The streetcar company agreed to lengthen its Randolph Avenue line from Snelling Avenue to Cleveland Avenue and then west to the Mississippi River—in the middle of winter. The Saint Paul City Council approved construction of a 1½-mile “super highway” (Saint Paul Avenue) from West Seventh Street to Cleveland Avenue. Henry Ford insisted on construction of a bridge over the Mississippi River to carry workers, dealers, and buyers. Minneapolis and Saint Paul joined together in 1927 to share the \$1.3 million cost of constructing the Intercity Bridge.⁶

When the Twin Cities Assembly Plant was completed, the Ford Motor Company boasted that it was the largest branch plant in its organization and that it had been described by architects as “the finest structure devoted to this purpose anywhere.” The assembly building was one of three main components to the plant, which also included the hydroelectric plant (the company’s largest nationwide, and the only one associated with an assembly plant) and a model steam-power station. The entire plant was hailed as “an outstanding example of industrial utility combined with architectural beauty,” in part because of its picturesque location on the bluffs of the Mississippi River. Careful attention was given to landscaping and the layout of the grounds “to harmonize with the city’s plans for the development of the parkway” along the river.⁷



This photograph, published in the Saint Paul Daily News on April 26, 1923, shows Henry Ford (far left) and his son Edsel Ford (third from left) with a group of engineers inspecting the site of the planned Ford hydroelectric plant. (Minnesota Historical Society)

⁵ Brinkley, *Wheels for the World*, 217-219; Hennemann, “Secrecy Marked Coming of Ford Plant to Saint Paul Thirty Years Ago.”

⁶ Hennemann, “Secrecy Marked Coming of Ford Plant to Saint Paul Thirty Years Ago”; “Hydro Plant to Be Ready by Autumn,” *Ford News*, January 15, 1924; Peggie Autin Haschle, “Ford Paved the Way for Commercial Development of Area Sixty Years Ago,” *Highland Villager*, March 8, 1993. The Intercity Bridge (Bridge No. 3575, commonly known as the Ford Bridge) was listed in the National Register of Historic Places for its engineering significance in 1989.

⁷ “Work on Twin Cities Plant Well Under Way,” *Ford News*, October 15, 1923; “Largest Ford Branch Plant Is Occupied at Twin Cities,” *Ford News*, June 1, 1925; “Hydro Station in Operation at Saint Paul,” *Ford News*,

The Twin Cities Assembly Plant was designed by Albert Kahn, who was the architect of many Ford facilities including the River Rouge plant. The main building's exterior resembled the Ford



Engineering Laboratory in Dearborn, Michigan, also designed by Kahn and completed earlier in 1924. The manufacturing and assembly building was one story in height “in keeping with the latest Ford standard practice,” according to the company’s internal newsletter.⁸

The exterior style of Albert Kahn’s Ford Engineering Laboratory (left) was reinterpreted in his design for the Twin Cities Assembly Plant. (Federico Bucci, Albert Kahn: Architect of Ford)

Main Assembly Plant

The assembly building measured 1,400 feet long and 600 feet wide, with a total floor area of more than nineteen acres. The front and side facades were clad with buff Indiana limestone. Rectangular in plan, the building had a two-story, hipped-roof block in the center of the west facade that projected from the adjacent wall surfaces. The northwest and southwest corners also projected slightly. Fluted pilasters framed multi-light, steel-sash windows, evenly dividing the facades into seventy-two bays on the east and west and twenty-eight bays on the north and south. The bays were crowned with a streamlined frieze and a slightly projecting cornice supported by broad dentils. Bas-relief carvings were centered over the windows on the corner blocks. The main entrance was located on the west facade near the 4,400-square-foot

The clerestories that provided natural light to the interior of the main assembly plant are evident on this 1930 photograph of the rear facade. (Minnesota Historical Society)



November 15, 1924; “Introduction” (orientation handout), typescript, [1978?], available at Ford Motor Company Twin Cities Assembly Plant.

⁸ “Engineering Laboratory at Dearborn Completed,” *Ford News*, December 1, 1924; F. A. Fairbrother, “Processes Affect Design of Automobile Factories,” *Engineering News-Record* 93 (November 20, 1924): 834-836; Fay Leone Faurote, “How Ford Plans His Layout of Grounds, Buildings, and Plant,” *Factory and Industrial Management* 75 (June 1928): 1196-1199.

showroom in the northwest corner, which contained large, plate-glass display windows with six-light transoms. The building was topped with a hipped, red clay-tile roof at the perimeter and a flat roof in the center with rows of linear, M-shaped clerestories and monitors.⁹

The open interior of the plant was carefully designed to accommodate the snaking assembly line and specialty areas such as the paint shop, with little surplus space. Henry Ford stated how the interiors of his plants were planned:

Our machines are placed very close together—every foot of floor space in the factory carries, of course, the same overhead charge. . . . We measure on each job the exact amount of room that a man needs; he must not be cramped—that would be waste. But if he and his machine occupy more space than is required, that is also waste. This brings our machines closer together than in probably any other factory in the world. . . . Our factory buildings are not intended to be used as strolling parks.¹⁰

At the Twin Cities plant, Ford’s fundamental principles—the economy of space and insistence upon cleanliness, lighting, and ventilation—were apparent. Exposed steel columns, beams, and trusses organized the space into large, open bays with minimal structural intrusions. To conserve floor space for assembly equipment, lavatories and other service areas were elevated on platforms attached to the steel structure of the building. Extensive windows on the exterior walls and angled rooftop monitors flooded the plant with natural light, essential at the time due to poor output from electric lamps. The windows and clerestories could be opened mechanically to provide ventilation. A network of exposed radiator pipes near the ceiling brought hot-water heat—warmed by the steam plant—to the assembly floor.¹¹



The exposed interior structure, pipes, and ductwork can be seen in this photograph of a finished car on the assembly line along the west wall of the plant, 1935. (Minnesota Historical Society)

⁹ “Largest Ford Branch Plant Is Occupied at Twin Cities”; Benjamin M. Cowan, “The Twin Cities Plant of the Ford Motor Company,” *Stone and Webster Journal* 37 (July 1925): 60-72.

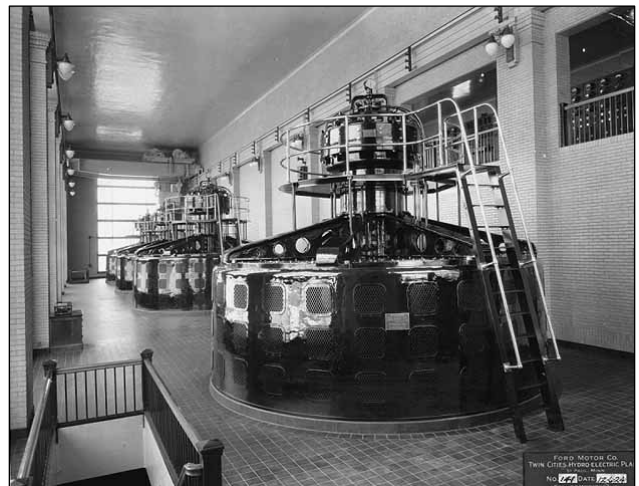
¹⁰ Federico Bucci, *Albert Kahn: Architect of Ford* (New York: Princeton Architectural Press, 2002), 41.

¹¹ *Ibid*; Cowan, “The Twin Cities Plant of the Ford Motor Company.”

Hydroelectric and Steam Plants

The same economy of design appeared in the two other principal components of the complex, the hydroelectric and steam plants, which were also the work of Albert Kahn. Described shortly after its completion as “a gem of a little building,” the hydroelectric plant was similar in style to the main assembly plant. The structure, which measured 160 feet long by about 74 feet wide and stood 48 feet high, was positioned at the base of the river bluff on a foundation poured when the adjacent dam was built between 1913 and 1917. (The foundation had to be modified to house Ford’s vertical turbine-generator units, rather than the older horizontal units it had been designed to accommodate.) The plant’s rectangular form had an exterior of buff-colored brick with a wide, limestone frieze. Vertical, multi-light windows filled each facade, separated by brick piers. Bas-relief sculptures of stylized Indian heads were centered over each of the window bays. The building was capped with a red clay-tile hipped roof.

An enormous generator room that spanned the length of the building and had a thirty-six-foot high ceiling dominated the interior of the plant. Four huge generators, each twenty feet wide and rising eighteen feet above the floor level, filled the vaulted space. Three balconies overlooking half of the generator room housed electrical control equipment. The interior was finely appointed, with red and black tile floors, pressed-brick walls, enameled steel beams with exposed rivets, and polished nickel railings and trim. The large windows flooded the interior with light, aided by double sconces placed high on the capitals of the pilasters separating the windows.



Four 4,500-foot generators filled the main level of the hydroelectric plant. (Minnesota Historical Society)

The generators, each capable of 4,500-horsepower, were operated by vertical turbines located twenty-eight feet below the main level of the plant. Underground transmission lines supplied the electricity to the assembly plant. The hydroelectric plant was placed in service in July 1924. The electricity generated was sold to Northern States Power (NSP), the local utility, until the assembly plant was completed the following spring, and excess power in subsequent years was also sold to NSP.

Although the steam plant lacked the clay-tile hipped roof characteristic of the assembly and hydroelectric plants, its exterior was compatible in style to these other principal buildings. The walls were buff-colored brick, with multi-light, steel-sash windows on all sides. Like the nearby hydroelectric plant, the building also stood at the river level, but the five-story building was formed of two set-back blocks. Only the tapered, cylindrical, buff-colored brick smokestack projected above the bluff.

The five-level interior of the steam plant had walls of glazed brick with rounded corners, red tile floors, and enameled steel beams. There was an exposed staircase with enameled steel treads and polished nickel railings in the northeast corner, and an adjacent passenger elevator with three sliding, wire-glass doors. Large multi-light windows, two rooftop skylights, and decorative wall sconces lit the vaulted interior spaces.

The steam plant also was hailed for its efficiency, with equipment arranged to maximize heat extraction for electricity generation, manufacturing purposes, and warming the assembly plant. The steam plant contained two boilers fired by pulverized coal and a 5,000-kilowatt turbo generator, with space for one more. Coal traveled underground by belt conveyor from the hopper house on the east side of the assembly plant across an enclosed bridge to the upper level of the steam plant.

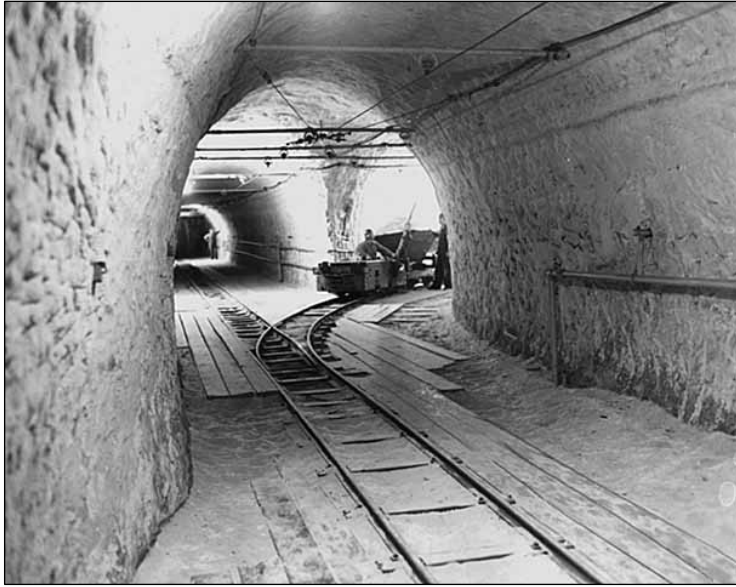
Accessory Buildings, Structures, and Objects

In addition to the three main buildings, the Twin Cities Assembly Plant contained several accessory buildings and structures that contributed to the operational efficiency of the plant. A buff-colored brick, gable-roofed building on the east side pumped oils to the painting and enameling equipment near the center of the assembly floor. Another freestanding, rectangular hopper house near the east wall of the assembly plant had massive doors on the north and west facades, where coal cars deposited their loads as they were pulled through the building. Railroad spur lines approached the plant from the southeast and reached inside the assembly plant in two depressed troughs so that the car and plant floors were level. In a utility tunnel underneath the main assembly plant, a belt conveyor over one thousand feet long moved coal from the hopper house directly to the steam plant. The conveyor passed through an enclosed bridge that connected the tunnel at the edge of the bluff to equipment on the upper level of the steam plant, where the coal was pulverized before being fed to the boilers. A 650-foot wharf between the steam and hydroelectric plants was equipped for barge shipping, and underground transport tunnels extended from the base of the river bluff near the barge dock to parallel freight elevators that rose 150 feet to the main plant. A well house drew water from the Mississippi directly to the boilers of the steam plant, screening it to remove particulates and increase efficiency.¹²



An enclosed bridge connected the steam plant to an underground conveyor that carried coal from the east side of the assembly plant. The tunnel entrance and barge dock are also shown in this 1936 photograph. (Minnesota Historical Society)

¹² “Largest Ford Branch Plant Is Occupied at Twin Cities”; “New Saint Paul Steam Plant Designed for Fuel Conservation,” *Ford News*, February 1, 1925; Cowan, “The Twin Cities Plant of the Ford Motor Company.”



Sand for glassmaking was mined under the plant in tunnels that grew in length until operations at the glass plant ceased in 1959. This photograph dates from 1941. (Minnesota Historical Society)

Shortly after the plant was put into operation, additional tunnels were excavated for sand mines and a glass factory was set up inside the assembly plant. The glass plant was an afterthought, constructed only because the silica in the sandstone underneath the site was found to be the proper composition for glassmaking. Also, shipment of completed automobiles by tunnel and barge proved cumbersome and difficult, rendering the tunnels otherwise useless. The glass plant, the only facility of its type in the world housed within an automobile assembly plant, was used continuously from 1926 to 1932, was decommissioned for about five years during the Great Depression,

and was put back into service in 1937 with new equipment and production methods. Over approximately thirty years, the network of glass mine tunnels under the plant grew to more than three miles in length before glassmaking operations ceased at the plant in 1959.¹³

Changes at the Twin Cities Assembly Plant

As an active industrial facility, the plant has experienced numerous interior and exterior changes (see appended site plan). The assembly line in the main building has been reconfigured repeatedly for the production of different models, but the basic orientation of the line has remained constant, with the heavy body work taking place on the east half and the assembly and finish production along the west wall of the plant.

Over a period of about thirty years, the assembly building was expanded nine times, from its original size of approximately 840,000 square feet to over 1.3 million square feet. The first significant addition occurred in 1943, when a 14,000-square-foot warehouse was built on the east side of the main plant, coinciding with conversion of the plant for Pratt and Whitney aircraft engine construction during World War II. In 1961, plant manager F. O. Fason announced the first Ford-led expansion, a 40,000-square-foot addition on the southeast corner of the main plant. Governor Elmer L. Andersen welcomed the announcement, stating, “The news that Ford Motor Company has launched a program of expansion and modernization is welcome and reassuring. We hope an improvement in the Minnesota business climate will result in a further and greatly enlarged expansion of the Saint Paul operation.” Andersen’s wish was granted only a few months later, when construction began on a second addition—twice the size of the first—near the southwest corner of the plant. Although these improvements were used for storage and

¹³ Hennemann, “Secrecy Marked Coming of Ford Plant to Saint Paul Thirty Years Ago”; Haschle, “Ford Paved the Way for Commercial Development of Area Sixty Years Ago.”

shipping and did not directly increase production capacity, they freed other areas of the plant for new assembly equipment and allowed the company “to build a better car,” according to Fason.¹⁴

Fewer than eight years later, another expansion added 85,000 square feet to the west side of the plant, bringing the total area of the building to over 1.3 million square feet. The 1969 addition housed a lengthened final assembly line with extra storage along the line, touted as a first step towards total modernization of the plant. The 1,420-foot length of the addition replaced over three-quarters of the original west facade with a solid wall of ribbed, cast-concrete panels. The addition was set back from the northwest corner of the plant, contrasting with the display windows and streamlined Classical ornament of the historic showroom exterior. The sixty-foot width of the addition’s north facade was smooth, limestone veneer. It contained an insert of the original bas relief carving of the plant’s motto, which had been salvaged from the frieze of the center block on the west facade. The phrase, “Excellence Is Never Granted to Man But as the Reward of Labor,” had been selected by Henry Ford when the plant was constructed in 1924.¹⁵



An 85,000-square-foot addition on the west side of the main assembly plant was dedicated on July 16, 1969. (*Saint Paul Pioneer Press*, July 17, 1969)

The solid facades of the addition, which was designed by the office of Albert Kahn, were distinctly modern in form and materials. The design epitomized the changes that were being made at the plant, in the company, and particularly in the American automobile industry, which was contending with the growing popularity of compact cars and import models. The addition also eliminated the glare and heat of the sun through the plant’s original, west-facing windows (a total of 11,025 square feet of glass), which made working conditions uncomfortable.¹⁶

Ford built a 154,000-square-foot, freestanding warehouse south of the main plant in 1966, later linked to the larger building by a series of small additions. Other structures and accessory buildings were constructed along the south and east sides of the main plant in the 1970s and 1980s. In 1984, a 275,000-square-foot vehicle painting facility was erected “on the hill” to the

¹⁴ “History of Twin City [sic] Branch,” typescript, May 7, 1952, available at Ford Motor Company Twin Cities Assembly Plant; “Introduction” (orientation handout), [1978?]; “Fason Announces Plans for Twin Cities Addition,” *Twin Cities Ford News*, March 22, 1961; “New TC Plant Addition Puts Twenty-two Acres under Single Roof,” *Twin Cities Ford News*, November 29, 1961.

¹⁵ “Expanded Ford Plant Dedicated,” *Minneapolis Star*, July 17, 1969; “Ford Plant Dedicates Twin Cities Addition,” *Saint Paul Pioneer Press*, July 17, 1969.

¹⁶ “Expanded Ford Plant Dedicated”; “Ford Plant Dedicates Twin Cities Addition”; Virgil W. Smith, “Ford, Here Since 1903, Expands Saint Paul Plant,” *Saint Paul Pioneer Press*, January 26, 1969; “Building Windows Sprayed for Employee Comfort,” *Twin Cities Ford News*, July 11, 1962; Brinkley, *Wheels for the World*, 594-597; Alton F. Doody and Ron Bingaman, *Reinventing the Wheels: Ford’s Spectacular Comeback* (Cambridge, Mass.: Ballinger Publishing Company, 1988), 4-12.

east of the plant. An elevated bridge spanning the east yard of the site extended the assembly line to the main plant. Most recently, a collaboration of Ford, the United Auto Workers, and Saint Paul College built an automotive training center near the northeast corner of the main assembly building in 1999.¹⁷

The Mississippi River flooded on April 12, 1952, swamping the ground level of the steam plant and causing the plant to shut down for one week. Damaged in the flood were a 13,000-volt transformer, twenty-four electric motors, seventeen pumps, electric cabling and oil switches, and the starters on all equipment. After the floodwaters receded, earthen fill was placed in the area around the steam plant, barge dock, and tunnel entrance. This raised the entrance of the steam plant one level, and the west-facing windows on the lower section of the plant were later filled in with brick. Three sides of the screen house and the entrance to the nearby tunnels were also buried. A gas-extracting building that had been added to the south side of the steam plant in 1926 was demolished in 1962.¹⁸

Most of the historic accessory buildings and additions are extant, although in some cases they have been further expanded and are now contiguous to the assembly plant. Freestanding modular structures that are scattered around the perimeter of the main plant obscure views of the historic buildings and their original dimensions and character.

Site features such as the railroad spur lines and paved parking and storage areas have expanded over the decades. Some of the landscape features, which were important early characteristics of the property, have also been altered by maturing vegetation or the removal of landscaped areas for parking or building expansion. When the main assembly plant was first constructed, the mature trees along Ford Parkway were retained, but around 1965, a large area with grass and trees was converted to surface parking. Large trees still line the perimeter of the intersection of Ford Parkway and South Mississippi River Boulevard at the northwest



The entire length of the plant's west facade, shown above in 1936, was clearly visible from South Mississippi River Boulevard. Passersby could watch as vehicles progressed down the assembly line next to the west-facing windows. The northwest corner housing the showroom is near the center of the photograph. (Minnesota Historical Society)

¹⁷ "Progress Report" (photograph caption), *Twin Cities Ford News*, July 15, 1966.

¹⁸ "The Year of the Big Flood," *Twin Cities Ford News*, April 18, 1962.

corner of the property. The open space along the west side of the assembly plant has evolved in the opposite manner. Historic photographs show that the original plantings were low and scattered, with a wide expanse of lawn affording clear views of the windowed facade. Now, there are many mature trees in this area, obscuring more of the building than was originally intended. The trees might have been planted around the time of the 1969 addition, which altered the original facade.

The Ford Motor Company property extends several hundred feet east of the assembly plant and all the way to Cleveland Avenue along its southern border. The east yard area was once occupied by an oval test track, built in 1942 for the testing of armored personnel carriers manufactured at the plant during World War II. Aerial photographs seem to indicate that Ford employees planted gardens within the track during the Depression and war years, a practice that was promoted by Henry Ford at locations throughout the country. The test track was removed in 1966 and the area leveled. The land was used for open storage until a shopping center was developed on the site in the mid-1970s. The paint plant, built in 1984, took up the remainder of the site.¹⁹

Near the intersection of Cleveland and Montreal Avenues stands a cluster of three baseball fields on property owned by Ford Motor Company. The fields have been used by the Little League organization since 1954, when the automobile company first granted the Highland Civic Association use of the site. One field was established that first season, with concrete-block dugouts, a concession stand, and wooden bleachers. Two similar fields were added in the early 1960s, and the original concession stand was replaced with a larger hipped-roof building that also housed restrooms. Two sets of dugouts, including the ones at the original field, have since been raised entirely above ground, but excavated dugouts are present at the southernmost field. The ball fields were in seasonal use until the summer of 2007, when high levels of contaminants were found in the soil and play was suspended at the site.



Ford-Highland Field was established in 1954 on Ford Motor Company property near Cleveland and Montreal Avenues. Two additional fields were constructed in the early 1960s.

¹⁹ Nevins and Hill, *Ford: Expansion and Challenge*, 589.

FINDINGS

Areas of Significance

The Twin Cities Assembly Plant has potential significance in two different historical contexts due to its role in the physical and economic expansion of the Ford Motor Company and its influence on the development of the Highland Park neighborhood and the cities of Saint Paul and Minneapolis.

When constructed in 1924, the Twin Cities Assembly Plant was the largest of several branch plants built by Ford at locations around the country. The company first developed branch assembly plants in the early 1910s—the downtown Minneapolis plant, built in 1914, was part of this first wave of expansion. By 1916, Ford operated twenty-eight branch factories nationwide and had fifty-one plants that produced parts and automobile components. Branch plants, which provided convenient shipping points for outlying territories, were essential to meeting the national consumer demand for Ford’s single automobile, the Model “T”, which revolutionized the industry with its standardization and affordability.²⁰

As Henry Ford refined production methods, the company needed to replace the earlier multi-story factories, which had been constructed for stationary assembly of vehicles and could not be retrofitted with conveyors and assembly lines. Ford embarked on a second expansion phase beginning in 1921, planning facilities in Saint Paul as well as in Chicago, Memphis, Charlotte, Norfolk (Virginia), and Jacksonville, where assembly plants were under construction by 1924. At the same time, additions were made to older branch plants in Kansas City and Oklahoma City. A few years later, plants were established or expanded in cities including Philadelphia, Cleveland, Dallas, Seattle, Long Beach and Richmond (California), Edgewater (New Jersey), and Alexandria (Virginia).²¹

The designs for these single-story assembly buildings were based on the company’s successful prototype in Highland Park, which began to take shape in 1909, and its immense River Rouge compound, begun in Dearborn in 1917. These suburban Detroit complexes were designed by industrial architect Albert Kahn, beginning Kahn’s long association with Ford. Most of the branch plants constructed through the 1940s also were designed by Kahn, and his office continued to be employed by Ford into the 1960s.²²

Of the eight facilities built in the early to mid-1920s, only the Twin Cities and Chicago plants have been in continuous operation. The Memphis, Charlotte, and Jacksonville facilities were closed during the Great Depression and never reopened by Ford. The Oklahoma City factory was reorganized as a parts depot in 1931, which then closed in 1967. The Kansas City plant was replaced by a new facility in 1940. Many of the later branch assembly plants designed by Kahn also are no longer associated with Ford, although some still stand. Notably, the 1931 Richmond Assembly Plant in the San Francisco Bay area has been listed in the National Register and

²⁰ Nevins and Hill, *Ford: Expansion and Challenge*, 255.

²¹ “Six Thousand Cars Yearly to Be Added to Branch Capacity,” *Ford News*, March 15, 1924; Bucci, *Albert Kahn: Architect of Ford*, 62-64; Nevins and Hill, *Ford: Expansion and Challenge*, 574.

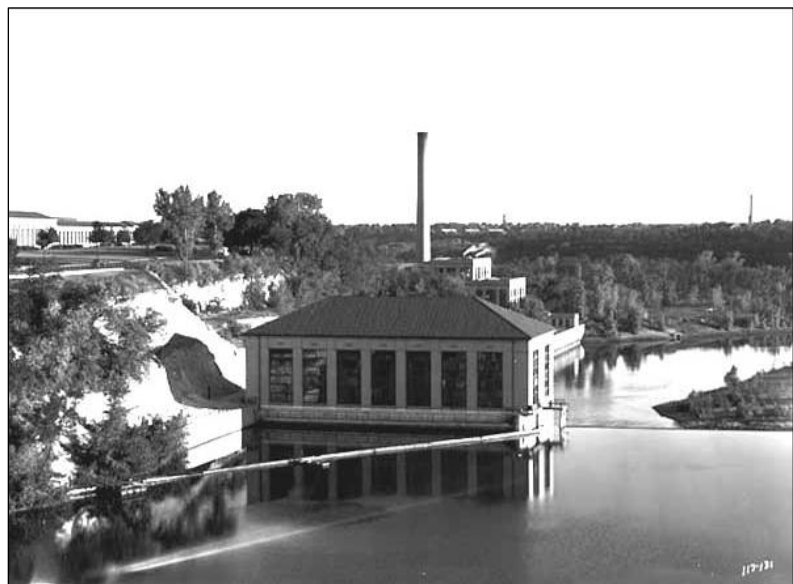
²² Bucci, *Albert Kahn: Architect of Ford*, 38-57.

renovated to house the Rosie the Riveter National Park, interpreting home-front efforts during World War II.²³

As evidenced by the failure of so many plants, the Ford Motor Company's expansion from the 1910s through the 1930s was impulsive and uneven, guided more by Henry Ford's zeal than his business sense. During this time, the company itself was unorganized and somewhat ineffectual. In the mid-1920s, Ford's Model "T" fell out of favor with consumers and the company had difficulty maintaining its market share in competition with the variety of models produced by General Motors and Chrysler. Ford decided to scrap the Model "T" in 1926, just a short time after opening a number of new plants, including the Twin Cities Assembly Plant. The factories were closed down and retooled to produce the Model "A". Fortunately for Ford, the Model "A" was an equal success and the premature building investment left the company well positioned for production—that is, until the full effects of the Great Depression hit the automobile market in 1931. Ford shuttered dozens of plants nationwide; the Twin Cities facility was closed from 1933 to 1935.

One factor that made the Twin Cities Assembly Plant more successful than most was its hydroelectric plant, which provided an inexpensive supply of electricity during even the most economically difficult years. Although the plant was shut down for two years during the Great Depression, it was able to continue operating the hydroelectric plant, selling the electricity to local utilities.

The Twin Cities plant might also have been favored by Henry Ford because it successfully embodied so many of his personal and business philosophies. The factory was located on a scenic site, outside of the central city. It had easy access to multiple forms of transportation, although Ford's aspirations to ship completed vehicles by barge proved cumbersome and unfruitful. It also fulfilled his fascination with hydroelectric power, which he had pursued on a smaller scale at numerous other sites. The Twin Cities hydroelectric plant was, in fact, the largest in the Ford Company and the only one capable of supplying all of the electricity needed by its accompanying assembly plant.



The Ford Hydroelectric Plant, shown above in 1936, has been in operation since it first went on-line in 1924. It still provides nearly all the electricity needed by the plant. (Minnesota Historical Society)

²³ In addition to eight assembly plants that are listed in the National Register, several Ford plants have been documented for the Historic American Engineering Record (HAER): Ford Motor Company Long Beach Assembly Plant (HAER No. CA-82), Rosie the Riveter National Historical Park, Ford Assembly Plant (HAER No. CA-326-H), and Ford Motor Company Edgewater Assembly Plant (HAER No. NJ-53).

The Twin Cities Ford plant was important outside of the company, as well. The plant's presence fueled waves of residential and commercial development in Highland Park, as the surrounding area of Saint Paul soon became known. The neighborhood was not the only geographical entity to be named in honor of the company. The street that borders the north edge of the plant was called Edsel Avenue before its current name—Ford Parkway—was determined.

Real estate speculation was rampant following the announcement of Ford's expansion to Saint Paul, but the difficulties of the Great Depression resulted in most of the residential lots standing vacant until after World War II. Historic aerial photographs illustrate the pace of development. In the 1920s, the land surrounding the plant was mostly vacant and wooded. Few houses stood on the Minneapolis side of the river, even though the Intercity Bridge was opened in 1927. By 1930, several commercial and apartment buildings had been built in the vicinity of the plant. Within the decade, several blocks of single-family houses were constructed on both sides of the Mississippi only a short distance from the plant. The Highland Village Apartments was built by the Works Progress Administration (WPA) directly to the east of the Ford plant in the late 1930s. By 1951, the commercial area at the intersection of Ford Parkway and Cleveland Avenue was well established and blocks of single-family houses completed the neighborhood. Similar growth took place on the west side of the river, especially north of East Forty-sixth Street.



This aerial photograph from about 1926 shows the largely undeveloped areas of Saint Paul to the north and east of the Ford Twin Cities Assembly Plant and South Minneapolis on the opposite side of the Mississippi River. (Minnesota Historical Society)

The increasing demand for water service to the area also indicates the rate of growth. The year that the Ford assembly plant was constructed, the City of Saint Paul built a tiered, underground water reservoir at Snelling Avenue and Ford Parkway. Four years later, the 200,000-gallon Highland Park water tower was completed. By 1959, residential development had grown to the extent that another reservoir and a one million-gallon water tower were needed to meet the needs of the area.²⁴

While it is not possible to directly measure the influence of Ford on the growth rate of Highland Park and South Minneapolis, the plant clearly served as an anchor to the development of these neighborhoods.

Assessment of Integrity

The Twin Cities Assembly Plant contains several buildings and other resources that date from its original period of construction. The three principal structures—the main assembly building and the hydroelectric and steam plants—are present. The historic integrity of the hydroelectric plant is excellent; although the equipment has been updated, the building itself has experienced few exterior or interior alterations. The main building and steam plant, on the other hand, have had numerous alterations that compromise their historic integrity.

The main assembly building—the largest individual resource at the plant—has experienced the most change. The exterior of the building was dramatically altered in 1969 by the addition along its west facade. Multiple additions on the south side of the building and the enclosure of the window bays on the north facade also have had deleterious effects. These additions and alterations do not contribute to the significance of the building on the basis of age (they are fewer than fifty years old) and they do not appear to be of exceptional importance, as would be required to meet National Register Criteria Consideration G.



By the mid-1950s commercial areas and residential blocks were well established in the Highland Park neighborhood of Saint Paul. (Minnesota Historical Society)

²⁴ Highland Water Tower information display, available from the Saint Paul Regional Water Services, Saint Paul, Minnesota.

Many of the assembly building's distinctive historic features do remain, such as six of the original window bays on two facades at the northwest corner of the building. These windows, which once opened to the company showroom, are largely intact, with six-light vertical transoms over modern, six-light display windows. The transom mullions, lower rail, and outside window frames are cast iron with scrollwork motifs, but the transom glass has been replaced by insulated, painted sheet metal. Original cast-iron lamps project from the fluted pilasters between the windows.



The northwest corner of the plant, which was the location of the historic salesroom, is relatively intact.

Four more bays on the west facade retain their original dimensions and some historic characteristics. Original steel, multi-light transoms and sashes surround a modern door that replaced the original main entrance to the south of the showroom area. The remaining three openings on this facade have modern, nine-part windows. On the north facade, the two window bays east of the corner block have steel, multi-light transoms over modern, six-part windows. The original window bay dimensions are intact along the remainder of the north facade, although in most cases the openings have been filled with painted concrete block. Many of the bays contain one or two small, fixed-pane windows.

The hipped, clay-tile roof of the original structure is intact, but not visible at present, as it sits behind the flat roof of the 1969 addition. The plank sheathing of the entire roof and the vaulted, hipped form of the original center pavilion can still be seen inside the plant.



The historic appearance of the west facade has been eclipsed by the 1969 addition (shown at right) and mature trees.

Despite the frequent reconfigurations of the assembly line, the basic structural elements of the main plant interior are intact. Distinctive features such as the exposed steel columns, beams, and trusses, elevated restrooms and service areas, and network of plumbing and heating pipes are evident. The glass in the original clerestories and monitors has been replaced with corrugated, insulated fiberglass, but the structures themselves are unaltered.

The historic integrity of the steam plant also has been compromised by window enclosures, primarily on the entire west facade. When the site surrounding the steam plant was regraded in the 1950s to prevent future flood damage, other historic resources in the area were affected. Three facades of the screening house to the west of the steam plant were also buried, so that only the flat roof of the building is immediately visible. The nearby entrance to the glass and transport tunnels is intact but buried so that only the top two steps of the entrance wall are visible. A concrete slab with two vertical access hatches sits in front of the tunnel wall, and the exterior view gives no indication of the extensive tunnel system beyond. The tunnels were a pivotal element of the assembly plant at the time of its construction and would be critical in interpreting the history of the plant. The barge dock, which was another important feature of the site, has had no significant alterations.



The window openings on the west facade of the steam plant were enclosed following flooding in the 1950s.

The changes to the Twin Cities Assembly Plant must also be assessed within the context of the Ford organization. Since the plant initially was designed with an “economy of space,” there was an obvious need for expansion as production grew over the course of the twentieth century. Inherent in Ford’s conception was an idea of industrial production susceptible to continuous, necessary revisions. All continually operating Ford Motor Company assembly plants, including the one in the Twin Cities, have experienced some degree of physical change. In fact, most that have not were decommissioned by Ford only a short time after they were completed and were never given the opportunity to grow. Although no longer in use, plants built around the same time as the Twin Cities Assembly Plant might better represent the architectural characteristics of the company’s mid-1920s expansion. Other plants that were earlier examples of the evolution of assembly line manufacturing, such as the facilities in downtown Louisville, Cincinnati, Omaha, and Cleveland, are listed in the National Register. Most of these buildings have been adaptively reused as commercial or residential spaces.²⁵

²⁵ Bucci, *Albert Kahn: Architect of Ford*, 42. Assembly plants buildings from the mid-1920s that appear to be relatively intact include those in Memphis, Charlotte, Alexandria, and southwest Louisville.

Although some of the changes to the main assembly building and steam plant could be reversed, restoring their historic appearance, numerous later additions to the plant would be more difficult to undo. Ultimately, the individual buildings and the site as a whole have experienced so many alterations and additions that the plant is not sufficiently intact to convey its age and importance.

The Ford-Highland Fields have no apparent significance pertaining to the Ford Motor Company or the Twin Cities Assembly Plant. Evaluating their potential significance in the context of recreation and sports is beyond the scope of this project. In any event, the ball fields could only be eligible for listing in the National Register under Criterion A (Recreation) if they qualified as exceptionally important under Criteria Consideration G, because their current configuration is a product of the 1960s expansion—too recent to meet the National Register’s fifty-year threshold.

CONCLUSION

While the Ford Motor Company Twin Cities Assembly Plant might meet criteria for listing in the National Register of Historic Places and designation by the Saint Paul Heritage Preservation Commission, its integrity is too compromised for the property to qualify for either. The hydroelectric plant is eligible for National Register listing under Criterion A in the area of Industry, as previously determined. Further study would be needed to assess the potential for the significance of the Ford-Highland Fields under National Register Criterion A in the area of Recreation, but the fields would have to be “exceptionally important” under Criteria Consideration G because of their relatively recent vintage.

Although the plant’s poor integrity disqualifies it for local or national designation, this does not negate its historical significance to the city of Saint Paul, the state of Minnesota, or the Ford Motor Company. New development on this site should incorporate references to the history of the plant and its importance to the community (for example, adapting design motifs; using salvaged materials—or even reusing structures, if feasible; acknowledging segments of the layout of the plant, such as the assembly line, and the overall facility; creating an exhibit). Prior to the plant’s demolition, the entire facility should be documented for the Minnesota Historic Property Record with large-format archival photographs and a written narrative explaining the significance of the plant, including the context of the mid-1920s wave of national expansion.



Window openings on the north facade of the main assembly building have been enclosed with concrete block.

SOURCES CONSULTED

- “Assembly Plant Marks 50th Anniversary.” *Twin Cities Ford News*, October 3, 1962.
- Brinkley, Douglas. *Wheels for the World: Henry Ford, His Company, and a Century of Progress*. New York: Viking Press, 2003.
- Bucci, Federico. *Albert Kahn: Architect of Ford*. New York: Princeton Architectural Press, 2002.
- “Building Windows Sprayed for Employee Comfort.” *Twin Cities Ford News*, July 11, 1962.
- “Control Center.” *Northlander*, September 7, 1984.
- Cowan, Benjamin M. “The Twin Cities Plant of the Ford Motor Company.” *Stone and Webster Journal* 37 (July 1925): 60-72.
- Doody, Alton F. and Ron Bingaman. *Reinventing the Wheels: Ford’s Spectacular Comeback*. Cambridge, Mass.: Ballinger Publishing Company, 1988.
- “Engineering Laboratory at Dearborn Completed.” *Ford News*, December 1, 1924.
- “Expanded Ford Plant Dedicated.” *Minneapolis Star*, July 17, 1969.
- Fairbrother, F. A. “Processes Affect Design of Automobile Factories.” *Engineering News-Record* 93 (November 20, 1924): 834-836.
- “Fason Announces Plans for Twin Cities Addition.” *Twin Cities Ford News*, March 22, 1961.
- Faurote, Fay Leone. “How Ford Plans His Layout of Grounds, Buildings, and Plant.” *Factory and Industrial Management* 75 (June 1928): 1196-1199.
- Ford Motor Company to L. C. Hobson, Mayor of Saint Paul. September 13, 1921. Available at the Research Center, Henry Ford Museum and Greenfield Village, Dearborn, Michigan.
- “Ford Motor to Observe 50th Year in Minnesota.” *Saint Paul Pioneer Press*, September 16, 1962.
- “Ford Plant Celebrates Six-millionth Vehicle to Roll off Production Line.” *Highland Villager*, May 9, 1990.
- “Ford Plant Dedicates Twin Cities Addition.” *Saint Paul Pioneer Press*, July 17, 1969.
- “General History.” Ford Supervisor’s Manual. March 1949. Available at Ford Motor Company Twin Cities Assembly Plant.

- Haschle, Peggie Autin. "Ford Paved the Way for Commercial Development of Area Sixty Years Ago." *Highland Villager*, March 8, 1993.
- Helms, Marisa. "Hydro Power May Be Saint Paul Ford Plant's Salvation." *Minnesota Public Radio*, February 12, 2006.
<http://minnesota.publicradio.org/display/web/2006/02/13/forddam/> (accessed October 30, 2007).
- Hennemann, Carl. "Secrecy Marked Coming of Ford Plant to Saint Paul Thirty Years Ago." *Saint Paul Pioneer Press*, June 14, 1953.
- "Highland Water Tower." Informational Display. Available from the Saint Paul Regional Water Services, Saint Paul, Minnesota.
- "Historical Overview, Ford Motor Company, Twin Cities Assembly Plant." Typescript. April 1999. Available at Ford Motor Company Twin Cities Assembly Plant.
- "History of the Rouge." *The Henry Ford: Ford Rouge Factory Tour*.
<http://www.thehenryford.org/rouge/history.asp>.
- "History of Twin City [sic] Branch." Typescript. May 7, 1952. Available at Ford Motor Company Twin Cities Assembly Plant.
- Horwich, Jeff. "Minnesota's Ford 'Focus'." *Minnesota Public Radio*, March 1, 2006.
<http://minnesota.publicradio.org/display/web/2006/02/28/fordplant/> (accessed October 30, 2007).
- Horwich, Jeff, Tom Scheck, Tim Pugmire, and Annie Baxter. "Ford Confirms Shutdown of Saint Paul Plant." *Minnesota Public Radio*, April 13, 2006.
<http://minnesota.publicradio.org/display/web/2006/04/13/fordclosure/> (accessed October 30, 2007).
- "Hydro Plant to Be Ready by Autumn." *Ford News*, January 15, 1924.
- "Hydro Station in Operation at Saint Paul." *Ford News*, November 15, 1924.
- "Introduction." (Orientation handout.) Typescript. [1978?]. Available at Ford Motor Company Twin Cities Assembly Plant.
- "Landmark Falls." *Twin Cities Ford News*, November 28, 1962.
- "Largest Ford Branch Plant Is Occupied at Twin Cities." *Ford News*, June 1, 1925.
- Lewis, David L. "Still Going Strong at 70." *Cars and Parts*, January 1983, 153.

- McMahon, Brian. "Minneapolis and Saint Paul Stumble: Henry Ford Wins the Power Struggle for the High Dam." *Ramsey County History* 42 (Summer 2007): 4-14.
- "Molehills out of Mountains." *Twin Cities Ford News*, December 7, 1966.
- Nevins, Allan and Frank Ernest Hill. *Ford: Decline and Rebirth, 1933-1962*. New York: Charles Scribner's Sons, 1963.
- . *Ford: Expansion and Challenge, 1915-1933*. New York: Charles Scribner's Sons, 1957.
- "New Construction Notes." *Northlander*, September 15, 1989.
- "New Saint Paul Steam Plant Designed for Fuel Conservation." *Ford News*, February 1, 1925.
- "New TC Plant Addition Puts Twenty-two Acres under Single Roof." *Twin Cities Ford News*, November 29, 1961.
- "North Wall Remodeling Project Announced." *Twin Cities Ford News*, April 3, 1963.
- "Progress Report." *Twin Cities Ford News*, July 15, 1966.
- Roise, Charlene K., and Elizabeth A. Gales. "Response to Additional Information Request, Ford Hydroelectric Project." FERC Project No. 362 / SHPO Project No. 2000-3518. September 2003. Available at the State Historic Preservation Office, Minnesota Historical Society, Saint Paul.
- "Saint Paul Gets \$10,000,000 Ford Plant." *Saint Paul Daily News*, January 9, 1923.
- "Six Thousand Cars Yearly to Be Added to Branch Capacity." *Ford News*, March 15, 1924.
- Smith, Virgil W. "Ford, Here Since 1903, Expands Saint Paul Plant." *Saint Paul Pioneer Press*, January 26, 1969.
- "Ten Big Things New Ford Plant Brings to Saint Paul." *Saint Paul Daily News*, January 9, 1923.
- "Twin Cities Assembly Plant: Historical Overview." Typescript. Available at Ford Motor Company Twin Cities Assembly Plant.
- "W.R.A.P. Building Addition." *Northlander*, June 18, 1989.
- "Warm Plant Demands Around-Clock Vigil." *Twin Cities Ford News*, February 20, 1963.
- "Work on Twin Cities Plant Well Under Way." *Ford News*, October 15, 1923.
- "The Year of the Big Flood." *Twin Cities Ford News*, April 18, 1962.

APPENDIX

