Session # 12

PLANS, TRAINS, AND AUTOMOBILES:
BIG RIVER CROSSING ISSUES IN A SMALL COMMUNITY

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ABSTRACT

As transportation system elements of this country continue to evolve, issues that may have seemed foregone to a prior generation have crystallized into topics requiring substantive review. Witness, for example, the resurgence of both freight railroad and non-motorized traffic concerns. This trend is particularly noticeable in smaller metropolitan areas. The challenge for today's transportation professionals is to systematically identify and incorporate these broad issues into a meaningful project-specific context. This paper addresses cross-cutting topics associated with the replacement of a regional Mississippi River crossing along the Great River Road. The breadth and depth of issues define the ease with which transportation problems can be solved. In the St. Cloud, Minnesota, metropolitan area, the Sauk Rapids bridge replacement has generated a myriad of these issues. When applied to a river crossing replacement of metropolitan significance, broad-based representation from the community (defined as residents, business owners, elected officials, and transportation professionals) is essential. Engaging and educating this cohort has ultimately fostered consent in the selection of the preferred replacement alternative.

Since the structural condition of the existing bridge warrants replacement, consideration of alternatives has commenced. The presence of a railroad mainline on one of the existing bridge approaches broadened the scope of potential replacements to encompass grade-separation. The practicality of applying computer tools such as MicroBENCOST, TRAF-NETSIM, and TranPlan to monetize the user benefits associated with eliminating the current at-grade crossing is evaluated. This paper also discusses the paradigm shift among area planners regarding alternative transportation modes. The existing structure is two lanes wide, with little accommodation for non-motorized transportation. On the replacement, however, these other modes will be encouraged through the provision of enhanced bicycle and pedestrian capacity. The paper summarizes the qualitative and quantitative attributes of the alternatives and reports on the outcome of the engineering feasibility study and environmental assessment.

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INTRODUCTION

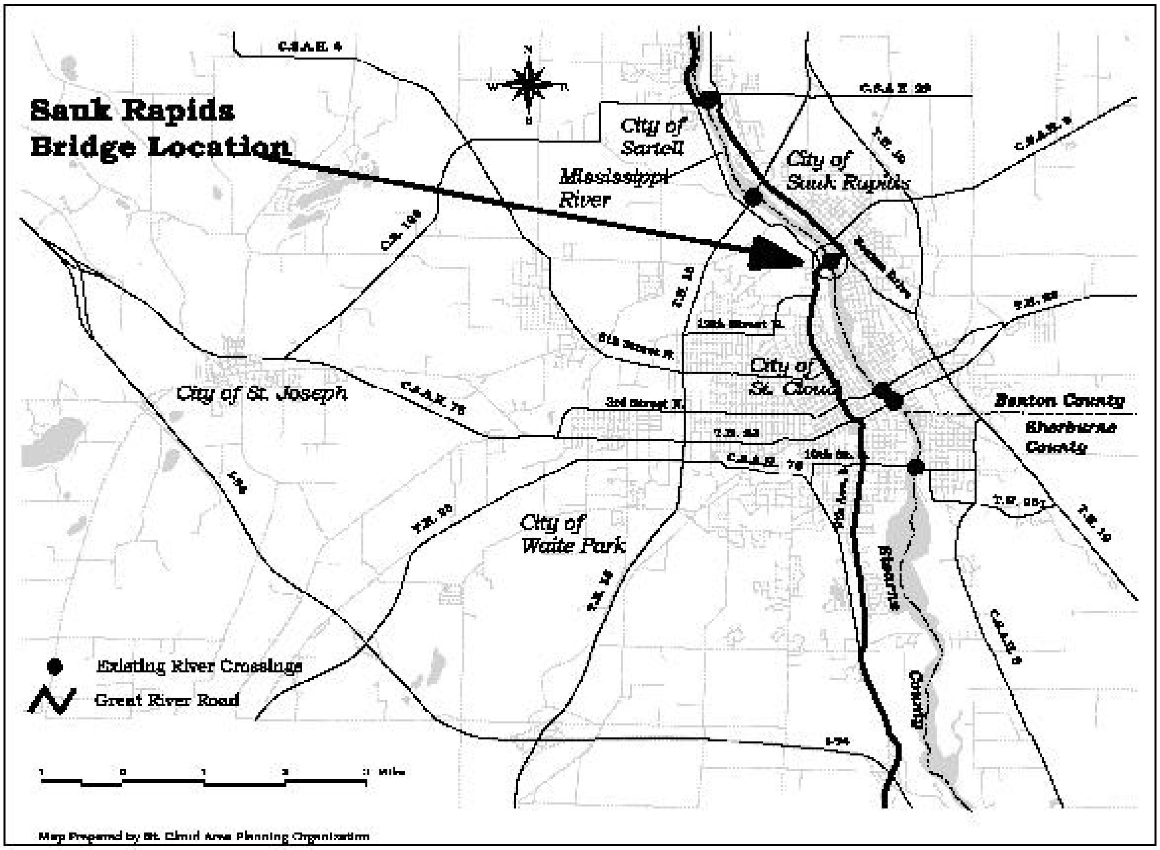
As transportation system elements of this country continue to evolve, issues that may have seemed foregone to a prior generation have crystallized into topics requiring substantive review. Witness, for example, the resurgence of both freight railroad and non-motorized traffic concerns. This trend is particularly noticeable in smaller metropolitan areas. The challenge for today's transportation professionals is to systematically identify and incorporate these broad issues into a meaningful project-specific context. This paper addresses cross-cutting topics associated with the replacement of a regional Mississippi River crossing along the Great River Road.

The breadth and depth of issues define the ease with which transportation problems can be solved. The St. Cloud, Minnesota, metropolitan area is located 70 miles northwest of Minneapolis-St. Paul. In this small community, the Sauk Rapids bridge replacement has generated a myriad of these issues. When applied to a river crossing replacement of metropolitan significance, broad-based representation from the community (defined as residents, business owners, elected officials, and transportation professionals) is essential. Engaging and educating this cohort has ultimately fostered consent in the selection of the preferred replacement alternative.

PROJECT BACKGROUND

First constructed in 1878, the Sauk Rapids bridge crashed into the Mississippi River when an ice jam uprooted its foundations. Rebuilt in 1879-80, it withstood storms and ice until 1896 when a tornado loosened a span, causing considerable damage. The third bridge was built in 1900, but was labeled inadequate prior to the Second World War. In 1947, a new two-lane bridge and approach roadway was constructed (Figure 1). This marked the first significant change to the approaches since the first bridge was built.

The replacement of other St. Cloud metro area Mississippi River bridges over the last 25 years has been accompanied by significant changes in horizontal and/or vertical alignment. In the early 1970s, the western approach for a replacement in downtown St. Cloud shifted a block north. A decade later, the replacement bridge location and its connecting roadways in the City of Sartell were altered to facilitate grade separation. At the same time, a replacement bridge on the south side of St. Cloud cut off several intersecting roadways. Given the historic context of bridge replacement in the St. Cloud metro area, similar changes for the Sauk Rapids location would not be unprecedented.



BIG RIVER CROSSING ISSUES

The study undertaken to identify a preferred alternative for replacing the existing Sauk Rapids bridge was framed by a broad set of design, operational, social, economic, and environmental issues. When considered in total, these issues represented a rather unique and challenging setting. The process for identifying the major project issues that played a large part in defining the course of the study is detailed below.

Issues Identification

The metropolitan planning organization for the St. Cloud Metropolitan Area initiated the identification of issues in 1995. At that time, the Sauk Rapids bridge was about to be turned back to Benton and Stearns Counties from the Minnesota Department of Transportation. The following spring, the MPO convened a task force with representatives from those agencies and the Cities of St. Cloud and Sauk Rapids. At the beginning of each meeting, the engineers muttered the mantra "It's okay to dream, but you have to build it when you wake up". These meetings resulted in a preliminary list of issues of concern. During the project development process, this list was refined to reflect additional information, agency responses, and citizen input.

Plans

Land Use

Development plans from the past have defined the setting within which the project is being undertaken. Existing land uses within the study area are a key force for driving the need for a new bridge. In addition, these uses define many of the issues which a solution needs to consider and satisfy.

Land use around the Sauk Rapids bridge is markedly different between the east and west sides of the Mississippi River. On the east side, the commercial/retail development of downtown Sauk Rapids is the dominant feature. The area contains millions of dollars of investment from the Sauk Rapids Housing and Redevelopment Authority and from the private sector. As a result, any potential right-of-way acquisition will come at a significantly higher cost. In addition to right-of-way costs, the proposed roadway changes need to avoid significant adverse impacts on access to and from the existing business community. City parkland provides a further constraint at the east approach to the bridge. Park property surrounds the existing approach roadway to the north and south.

On the west side of the river, development is primarily residential, with exception of the strip mall. The residential property owners along the west bank of the river near the bridge have historically been active regarding transportation issues in the area. Involving both the business owners on the east side of the river and the residents on the west side of the river has been an essential component in developing a preferred alternative for the river crossing.

Alternative Modes

Providing provisions for alternative transportation modes is another key planning aspect of the project. The existing bridge provides only a four-foot raised sidewalk for alternative travel modes including pedestrians and bicyclists. The limited pedestrian and bicyclist facilities on the bridge restricts effective and safe linkages between the trail systems which have been established on both sides of the Mississippi River. Transit service has also been impacted by the current bridge. Ten years ago, fixed route service was removed from the crossing because of unmanageable congestion at the bridge and the adjacent railroad grade crossing.

A paradigm shift has occurred among area planners regarding alternative transportation modes since the passage of ISTEA. Integrating both pedestrian/bicyclist and transit modal considerations into the preferred river crossing alternative has been important in attaining community consensus as well as federal funding support. Consequently, incorporation of these enhancements into the design concepts for the bridge has been accomplished with little fanfare.

Great River Road

The Sauk Rapids Mississippi River crossing is part of the federally designated route for the Great River Road. In the future, this route also has the potential for becoming designated as a federal All-American Route or a national Scenic Byway. The Great River Road has been established to provide a scenic, historic, and recreational roadway along the Mississippi River. Consequently, improvements

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undertaken as a part of this project will need to be carefully designed to complement the Great River Road experience.

Trains

Railroad Traffic

The mainline corridor of the Burlington Northern Santa Fe (BNSF) railroad, which is the highest speed and highest volume rail corridor in Minnesota, serves as a national conduit for intermodal, freight, coal, and agricultural products. Growth in intermodal shipments and coal demand over the past twenty years have contributed to increasing levels of railroad traffic on the BNSF mainline, which runs parallel to the Mississippi River through the project area immediately adjacent to downtown Sauk Rapids. Since our nation's Bicentennial in 1976, maximum train traffic has risen from 25 to 60 trains per day. Forecasts in the mid 1970s had predicted that 45 trains per day would use the BNSF mainline by 1990, with that number stabilizing and potentially declining by the year 2000. During the project development process, the public was skeptical of the existing and forecasted train values.

Additional growth in railroad traffic is limited by the lack of two continuous mainline tracks between Minneapolis and Fargo, North Dakota. BNSF has indicated that this bottleneck will be eliminated in the near future. As a result of building their way out of railroad congestion, a marked increase to 80 trains per day is certainly possible. The 21st century will usher in other strategies for increasing throughput, such as advanced railroad signaling systems.

Railroad Grade Separation

The presence of the BNSF mainline has been affecting bridge and roadway design in the St. Cloud metro area for over 40 years. When a new state highway alignment was constructed through the metro area in the 1950s, a roadway underpass was included three blocks east of the Mississippi River to eliminate conflicts with railroad traffic. During the mid-1970s, a series of studies focused on the impacts of the railroad and offered potential grade-separation strategies for coping with roadway service disruption at heavily traveled crossings. Over the past two decades, two grade-separated alternatives were chosen for bridging both the river and BNSF mainline. In both of these projects, a longer, more costly bridge was used.

Mn/DOT estimates the "exposure" at Minnesota's 5,100 railroad crossings by multiplying the average daily traffic times the number of daily trains. The exposure at the BNSF railroad and roadway interface adjacent to the Sauk Rapids bridge (1,200,000), which is the highest in the state, has increased by nearly 500 percent in the past 20 years. Currently, 40 percent of the vehicles crossing the BNSF mainline at-grade in the St. Cloud metro area use the Sauk Rapids bridge crossing. When taken with forecasted vehicular traffic, the Sauk Rapids bridge crossing could have an exposure of 3,200,000 by the Year 2020, an increase of 166 percent. This will have a

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tremendous impact on both safety and congestion. Thus, the presence of the Sauk Rapids bridge railroad crossing required broadening the scope of potential replacements to encompass grade-separation.

Automobiles

Structural Condition

Recent inspections of the bridge conducted by the Minnesota Department of Transportation (Mn/DOT) have concluded that the structural condition warrants replacement within the next eight years. An important factor in this determination is the presence of fracture critical structural members. With a sufficiency rating low enough to trigger structurally deficient status, this Mississippi River crossing has also been identified as the area bridge in greatest need of repair or replacement. Thus, the need to expediently pursue a preferred replacement alternative was clear.

Roadway Traffic

Growth in the St. Cloud metro area over the past twenty years has contributed to increasing levels of traffic on area roadways. These effects are witnessed most at bottlenecks formed by rivers and/or railroads. In the mid 1970s, approximately 10,000 vehicles per day crossed the Sauk Rapids bridge. Less than 20 years later, volumes had more than doubled to 23,000 vehicles per day. Despite the opening of the Minnesota Highway 15 bridge two miles upstream of the Sauk Rapids bridge in 1995, minimal traffic diversion has resulted in volumes of 20,000 vehicles per day on the latter. With a doubling to 40,000 vehicles per day forecasted for the Year 2020, a Sauk Rapids bridge replacement would need four through lanes.

PROJECT DEVELOPMENT PROCESS

An ambitious project development schedule was established to facilitate the implementation of this critical transportation project. This first step in the process includes the engineering feasibility study and environmental assessment. These efforts are scheduled for completion in the winter of 1998. Construction is scheduled to begin in the spring of 2001, with bridge opening anticipated for the fall of 2002.

Engineering Feasibility Study

An engineering feasibility study was begun in May 1997. The focus of the study was on the challenges of crossing the river and the railroad while addressing the four objectives outline above. Conducted in two steps, the definition of alternatives fueled creativity while deferring detailed consideration of impacts.

Universe of Alternatives

The first step considered the universe of options for crossing the Mississippi River and/or the railroad tracks at a very conceptual level. The initial screen focused on the physical feasibility of placing the alternatives in the built environment. Alternatives were screened out because they were unable to achieve minimum design standards. It was necessary to conduct and document this conceptual level screening analysis to avoid consideration of inappropriate alternatives at a later date.

Refined Set of Alternatives

The second screen involved a more detailed evaluation of screened alternatives based on identified evaluation criteria. The detailed evaluation was based on an assessment of the benefits, costs, and impacts of each alternative. Of the multitude of grade-separated alternatives generated in the first step, seven of them were deemed worthy of further consideration. Three of these alternatives, which would bridge over a minor arterial running parallel to the BNSF mainline, had few redeeming qualities and were cast into the ashbin of history. From the remaining four alternatives, two distinctly different grade-separated options were chosen to join the at-grade and no-build options in the environmental assessment. Although the grade-separated alternatives included temporary railroad track construction adjacent to the mainline, this feature was not fully defined until the environmental assessment phase.

Environmental Assessment

After agreement from the involved jurisdictions on the field of alternatives, the environmental assessment was initiated. Further review of social, environmental, and economic impacts, coupled with more refined engineering analysis, yielded a wealth of information on impacts. Of particular concern were the right-of-way acquisitions necessary in Sauk Rapids to accommodate the temporary railroad track. Given the perspectives of the different stakeholders, consensus could not be reached on a preferred alternative. A spirit of acrimony was beginning to take hold as policy boards ratified mutually exclusive recommendations on the alternatives. Ultimately, the consensus committee (described in the next section) renewed consideration of alternatives previously screened out of the process.

SMALL COMMUNITY INVOLVEMENT

A comprehensive community involvement program was developed at the onset of the feasibility study to ensure that the perspectives of all stakeholders were represented in the process. At the core of the program was the Oversight Committee, which included staff from Mn/DOT, Benton and Stearns Counties, the cities of Sauk Rapids and St. Cloud, the St. Cloud Area Planning Organization (MPO), the Sauk Rapids business community, and residences on both sides of the river. This group was effective and efficient in providing both technical guidance and community perspective.

One function not fulfilled by the Oversight Committee was direct communication among elected officials. Ultimately, a Consensus Committee composed of both staff and elected officials from those same agencies replaced the Oversight Committee. This group returned to the beginning of the project development process and proceeded forward, occasionally reviving previously discarded alternatives. This mixture ultimately reached consensus (hence the name) on a preferred alternative.

There were several other key components of the community involvement program. Four public information meetings were held at critical stages of the process. A cordial relationship was pursued with the newspaper and radio outlets to ensure that the project information was being received and understood. In addition, numerous presentations were made to local civic and citizen groups. Other innovative approaches toward public outreach including meeting announcements on changeable message signs located along the Mississippi River bridge approach roads. Together, these outreach efforts resulted in broad-based community representation and input on what has been recognized as a uniquely difficult regional transportation problem.

TOOLTIME IMPLEMENTATION

TranPlan

The MPO's travel demand model was applied to develop forecasts for the universe of alternatives during the engineering feasibility study. Since the variations among the alternatives were small when considered at a macroscopic level, the resultant traffic forecasts were similar. Incorporating travel time penalties for the at-grade crossing was not considered, since this practice was inconsistent with other locations within the model.

TRAF-NETSIM

This microscopic traffic model was used in an attempt to simulate the impact of the railroad at the at-grade crossing and adjacent signal. Unfortunately, the program is not sophisticated enough to simulate pre-emption at crossings. In addition, it became difficult to simulate long trains. Thus, this tool had limited usefulness in estimating user impacts.

Micro-BENCOST

During the alternatives evaluation process, some concern was raised relative to the financial justification for considering the more expensive grade-separation alternatives. To monetize the user benefits associated with eliminating the at-grade crossing, the economic analysis software package Micro-BENCOST was used. Of greatest importance when considering railroad grade crossing issues were railroad operation values such as train distribution, length, and speed. With the assistance of the BNSF, this data was collected and summarized in a meaningful fashion.

Downtown Business Survey

This tool was used by the local Chamber of Commerce because some members were concerned that business impacts were not being adequately addressed during the environmental process. With questions ranging from open-ended opinions to estimates of the potential for lost revenues and employees, the survey garnered a 50 percent response rate. The subsequent reaction from the elected officials questioned the credibility and objectivity of the results. Thus, this tool had limited effectiveness.

LESSONS LEARNED

As seen in this paper, addressing big river crossing issues in a small community requires more than just mindless rhetoric and black box evaluation. Indeed, modernization of this regional Mississippi River crossing in Sauk Rapids, Minnesota, has been undertaken with a consideration of diverse and complex issues. Presenting these issues in an effective manner requires engagement of a broad cross-section of concerned stakeholders to ensure that the cross-cutting issues do not place the transportation professional in the crossfire. Most assuredly, the preferred alternative in the case of the Sauk Rapids bridge replacement will result by achieving some level of mutually attained consent. From this experience, four key lessons have been learned:

1) *Engage Public in Issues Dialogue* – Using information meetings, civic and citizens groups, and the media, this activity will foster understanding and good will.

2) *Assemble Consensus Committee First* – With a cross-section of elected officials and technical staff from affected jurisdictions, this group can communicate ideas and positions directly and effectively in a non-threatening manner.

3) *Define Railroad Profile Impacts* – Given the required distances and offsets for constructing temporary railroad tracks, the alignment of any potential changes should be developed and reviewed prior to advancing alternatives into an environmental analysis.

4) *Apply Software Tools Appropriately* – Identification of potential applications should be accompanied by a review of each tool's capabilities to ensure a positive correlation between the desire for meaningful output and the ability to produce it.

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