



APWA MINNESOTA CHAPTER PUBLIC WORKS PROJECT OF THE YEAR NOMINATION FORM

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Submission Deadline: October 1, 2022

All nomination and supporting data are to be submitted as a PDF to Sarah at sarah.lloyd@bolton-menk.com with a maximum page size of 5 pages, including photos.

Project Nominated: City of Chanhassen, Highway 101 Improvements

Managing Agency: _____
Contact Person: _____
Agency Address: _____
Agency Phone Number: _____
Email: _____

Project Design Firm: _____
Project Construction Administration Firm: _____
Project General Contractor: _____

Name of Person Making Nomination: _____
Phone Number: _____
Email: _____

Criteria for Nomination

- Project must be substantially completed by October 31, 2021 or October 31, 2022.
- Includes use of innovative construction management techniques and completion of the project on schedule.
- Maintained excellent safety performance and safety program throughout construction.
- Evidence of strong community relations during all project phases.
- Consideration given to the environment. Sustainable design techniques involved.
- Unusual accomplishments given adverse conditions.
- Provides future value to the public works profession and perception by the public.
- Additional considerations such as value engineering, innovative project financing, multi-agency coordination and participation.

Reasons for Nomination: Describe the project with the aspects and features of the project that fulfilled any of the applicable criteria listed. (Include description on a separate page.)

Project Description

The **CSAH 101 Improvements** project included the reconstruction of one mile of two-lane rural section roadway to four-lane divided urban section roadway between Flying Cloud Drive and Pioneer Trail in Chanhassen. The existing project corridor consisted of steep grades and sharp curves which resulted in continuous safety issues. The steep grades were often challenging to traverse during the winter months due to slick conditions and maintenance crews were continually committing resources to the roadway to keep it passable. The reconstruction of this segment was the last link needed to complete the decades-long turnback of TH 101 to Carver County between TH 5 and the Minnesota River bridge crossing to Shakopee. This portion of the roadway was the most challenging segment to implement with an entirely new roadway alignment and deep cuts through the Minnesota River bluff to achieve an acceptable roadway grade.



FIGURE 1: EXISTING CONDITIONS SHOWING TIGHT CURVES AND STEEP GRADE

The existing rural section roadway provided no opportunities for pedestrians and bicyclists to travel the corridor. The project included the construction of trails along both sides of the roadway, a rectangular rapid flashing beacon (RRFB) pedestrian crossing, construction of a prefabricated bridge over CSAH 101 to facilitate the Minnesota River Bluffs regional trail crossing, construction of a second prefabricated bridge over Bluff Creek to facilitate a trail crossing along Flying Cloud Drive, and installation of a pedestrian tunnel under CSAH 101.

This \$30 million project located in the southern portion of Chanhassen is surrounded by a combination of larger rural residential lots and several undeveloped areas due to the lack of city utility service. The project included the extension of municipal water main and sanitary sewer to encourage future growth and redevelopment in the area.

Through the project development, MnDOT turned back the roadway to Carver County and the City of Chanhassen led the design and construction of the project. All three agencies were involved in the project from design through construction.



FIGURE 2: NEWLY CONSTRUCTED CSAH 101

Design Challenges and Solutions

Horizontal and Vertical Alignment

Due to the existing tight curves and steep grades, entirely new horizontal and vertical alignments were established during the design. The project team evaluated four different horizontal alignments—each alignment was evaluated based on adjacent property impacts, access to properties, historical significance, and environmental impacts. The existing roadway consisted of steep grades approaching 15% which created significant safety and maintenance concerns and required some unique approaches to manage stormwater. The preferred design of an 8% roadway grade required cuts of up to 43 feet and the removal of more than 430,000 cubic yards of material.

Pedestrian Accommodations

One of the project goals was to create a multimodal corridor that accommodates pedestrian and bicyclists as well as vehicle traffic. Trails were constructed on both sides of the north half of the roadway and only on one side of the roadway on the south half to balance property and environmental impacts and reduce earthwork costs through the bluff area. A RRFB pedestrian signal was installed midway through the corridor to facilitate a safe at-grade trail crossing and prefabricated bridges were constructed over CSAH 101 and Bluff Creek to facilitate Minnesota River Bluffs regional trail and local trail crossings. A pedestrian tunnel was also constructed to facilitate a trail crossing under CSAH 101.



FIGURE 3: PEDESTRIAN TUNNEL UNDER CSAH 101

Stormwater Design

Site constraints included steep slopes, highly erodible soils, wetland impacts and floodplain impacts. The optimal locations for stormwater management BMPs were unfortunately in areas consisting of muck soils and high groundwater. The resulting design used two filtration basins—one basin was constructed with a liner underneath to reduce seepage to the roadway embankment fill. The design included a multistage outlet structure that diverted flows for most rainfall events away from the eroding east ravine to the larger stormwater basin on the south end of the project. These features, along with a floodplain no-rise analysis on Bluff Creek, allowed the project to obtain approvals from two watershed districts.



FIGURE 4: DRAIN TILE CONSTRUCTION FOR STORMWATER BMP

Accommodate Future Utility Service

Chanhassen's comprehensive plan identified the extension of trunk water main and sanitary sewer along the project corridor. The project included the construction of 12-inch water main and 8-inch gravity sanitary sewer to prepare for the future extension of utility service for this area. A 35-foot-deep wet well was installed at the south end of the project to accommodate the future construction of a sanitary sewer lift station without impacting the

adjacent roadway and trail infrastructure. Multiple casings were installed under the roadway for future sewer forcemain installation.

Winter Maintenance

Although the project reduced the steep roadway grade, the proposed half-mile 8% grade still created a winter maintenance concern for Carver County. Maintenance crews would likely have to place significant amounts of salt during icy conditions to keep the roadway passable and it was noted that some of this salt could eventually end up in Bluff Creek and the Minnesota River. The design team evaluated an innovative in-pavement anti-icing system similar to the systems MnDOT uses on various bridges. The anti-icing system was bid as an alternate to manage project costs. The chosen alternative provided for the construction of the conduit and framework of the system so that it could easily be installed in the future if the County desires.

Right of Way Acquisition

The project required acquisition of permanent right-of-way and/or temporary easements from 38 different properties, a process that took years to accomplish. Design alternates were developed in many areas to reduce the impacts to private property.

Reasons for Nomination/Criteria for Nomination

Construction Management Techniques and Project Schedule

Due to the nature of the project, the earthwork operation was very complex with more than 430,000 cubic yards of material removed from the site, a 30-foot-deep muck excavation adjacent to an active roundabout, and a 40-foot fill in an existing ravine. The contractor established a process to excavate the muck and backfill with select granular material concurrently to maintain a stable excavation area. They filled the deep ravine in the first construction season and surcharged it by stockpiling select granular material to minimize settlement in the roadway during the second construction season.

Due to the long steep slopes on the project, managing erosion control during construction was a significant concern. The contractor completed the roadway construction in short segments to reduce the amount of exposed surface susceptible to erosion in a major rain event. The contractor and design team worked together to develop a strategy to stabilize the graded side slopes with a combination of bonded fiber matrix, reinforced fiber matrix, turf reinforcement mat, erosion control blanket, and rip rap ditch checks.

Due to the amount of grading, private utility relocations presented a significant challenge. The contractor, design team, and private utility representatives coordinated continuously throughout construction to temporarily relocate their facilities away from grading activities and then permanently relocate their facilities in a joint trench.

The project was successfully completed on schedule over the course of two construction seasons. The roadway was opened to traffic over the winter in between the construction seasons.



FIGURE 5: EARTHWORK OPERATION TO REMOVE 430,000 CY OF MATERIAL

Construction Safety Performance and Overall Program

The contractor's safety performance led to no significant accidents or injuries. The project began in March 2020 when COVID-19 crippled the nation. The project team responded by adjusting their practices and maintaining social distancing wherever possible. Weekly construction meetings were held outside and portable hand washing stations were placed near the job trailer to encourage a sanitary environment.

Community Relations

The project received strong support from the general public as it addressed numerous safety concerns, provided for safe pedestrian and bicycle use, and increased capacity of the corridor. During the evaluation of the roadway alignment alternatives, several meetings were held with the Chanhassen City Council, Carver County Board, and the general public to solicit feedback and inform the selection of a preferred alternative. Public engagement continued throughout the project design with three meetings held to gain support for the project and solicit feedback. A project website was created to provide project information and updates throughout the design and construction and email blasts were sent on a biweekly basis during construction to provide updates on construction and traffic control.



FIGURE 6: SCREENSHOT OF PROJECT WEBSITE

Environmental Considerations

Due to the realignment of the roadway and significant grading, numerous trees were removed. The project included a robust reforestation plan consisting of more than 1,300 trees and 550 shrubs to reestablish the graded areas along the project corridor. The contractor mined more than 50,000 cubic yards of select granular material from on site to substantially reduce the amount of trucking. The project included the framework of an innovative in-pavement anti-icing system to be installed in the future which will dramatically reduce the amount of sodium chloride used on the roadway that could ultimately discharge into Bluff Creek and the Minnesota River.



FIGURE 7: TREE PLANTINGS ALONG TRAIL AND ADJACENT TO STORMWATER BMP

Unusual Accomplishments Given

Adverse Conditions

The project is located on the highly erodible sandy bluffs along the Minnesota River. Many natural ravines exist in the area and undue care would certainly accelerate the already unstable geology. These conditions also created real risks and constraints to meeting the watershed abstraction (infiltration) requirements for the project. The design created a more regional filtration basin at the downstream limits of the corridor to meet filtration volume and pollutant load reduction requirements, while allowing the project to meet discharge rate control requirements.

Working in partnership with the two watersheds, the project team agreed to divert a significant portion of flows from the upper project limits that was eroding the east ravine area. While an improvement for the east ravine, the additional flows resulted in new challenges with managing the higher flows in the storm conveyance system along

the 8% grades and for the size of the downstream basin to detain greater volumes of water to manage peak discharge rate requirements.

Public Benefit and Service Nature of Project

The project increased the safety of the corridor by softening the roadway horizontal curves, reducing the roadway grade, increasing sight distance, and providing pedestrian and bicycle accommodations. The roadway expansion increased capacity of the corridor for commuter and truck traffic traveling between the Minnesota River and TH 212. The project created an environmentally friendly corridor with stormwater treatment, a significant re-forestation plan, and accommodations for future anti-icing infrastructure. The extension of water and sanitary sewer service will promote development in the southern areas of Chanhassen.



FIGURE 8: CSAH 101 WITH RRFB PEDESTRIAN CROSSING

Value Engineering, Innovative Project Financing, Multi-Agency Coordination

The project was a successful partnership between the City of Chanhassen, Carver County, and MnDOT. MnDOT turned back the roadway to Carver County and the City of Chanhassen administered the design and construction contract. The \$30 million project was funded through a combination of MnDOT, Carver County, City of Chanhassen, and State LRIP Bond funds. To help reduce project costs and plan for future improvements, the project included:

- Elimination of trail construction on one side of the roadway for the southern half of the project to reduce earthwork, environmental, and property impacts.
- Installation of a wet well and casings for a future sanitary sewer lift station to minimize future disturbance of roadway and trail infrastructure.
- Installation of the framework for construction of a future anti-icing system to reduce the use of road salt during the winter.



FIGURE 9: PEDESTRIAN BRIDGE OVER CSAH 101