



APWA MINNESOTA CHAPTER PUBLIC WORKS PROJECT OF THE YEAR NOMINATION FORM

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Submission Deadline: October 1, 2019

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:

Managing Agency: _____

Contact Person: _____

Agency Address: _____

Agency Phone Number: _____

Project Design Firm: _____

Project Construction Administration Firm: _____

Project General Contractor: _____

Name of Person Making Nomination: _____

Phone Number: _____

Criteria for Nomination

- Project must be substantially completed by October 31, 2019.
- 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.)

Public Works Project of the Year | APWA-MN Chapter | October 2019

Penn American Stormwater Storage Project

City of Bloomington, Minnesota





Project Overview

Bloomington's Penn American Stormwater Storage Project was initiated to serve the flood-prone area immediately southeast of the I-35/I-494 interchange in Bloomington, Minnesota. The key areas of concern included highly developed industrial and commercial areas where the natural low areas in the watershed are totally reliant on the existing storm sewer to relieve runoff from heavy rainfall events.

During even moderate rainfall events, runoff overwhelmed the existing storm sewer system and was stored above ground, within the streets and adjacent properties, until the existing pipe system could attenuate the flow. The highly impervious, fully developed nature of the contributing watershed combined with significant overland flows to the low storage areas only exacerbated the flooding. Because the area is fully developed, there is limited safe storage above ground before flood damage can occur. The city's plan for high-density, pedestrian friendly, and transit oriented redevelopment of the area limited the open space for excavating a stormwater detention basin as a potential solution. The most viable solution was determined to be an increase in the outfall storm sewer capacity.

Bolton & Menk was hired to engineer the outfall design of this critical system and, in support of this work, also evaluated and refined the city's preliminary XPSWMM modeling for the area to confirm the watershed's hydrology and the influencing design parameters.

A critical design aspect was to not cause downstream impacts to the system. Upper and Lower Penn Lake serve as the receiving water bodies for the watershed area, which also includes portions of I-494 and I-35W. The city could not increase the threat of flooding for the single family homes around the lakes, and the Minnesota Department of Natural Resources cited a rule prohibiting raising the 100-year peak levels of Upper Penn Lake, the receiving water body. These constraints resulted in the originally proposed large outfall design to not be constructed. Bolton & Menk continued to work with the city to develop a linear storage system that combined retention and conveyance of the runoff while mitigating the impact to Upper and Lower Penn Lake.

Penn American Stormwater Storage Project By the Numbers

- \$10 million flood mitigation project
- 700 feet of dual 16-foot by 9-foot box culverts
- 2,600 feet of 144-inch diameter Corrugated Metal Pipe (CMP)
- 900 feet of 72-inch storm sewer
- More than 12 acre-feet of underground storage





Innovative Construction Management Techniques

In order to complete the project on schedule, city contractor Minger Construction scheduled their crews to work throughout the 2018/2019 winter. In order to maintain progress during the ongoing freezing and sub-zero temperatures, Minger maximized the backfill opportunities by stockpiling soil on an available adjacent property. Backfill operations were able to progress throughout the winter by taking soil from the middle of the pile that hadn't frozen yet to use during construction. The contractor was also required to coordinate a schedule of activities that was compatible with the business closures and demolition of the adjacent buildings where the soil storage was planned.

Several hundred feet of the 72-inch storm sewer needed to be constructed adjacent to and crossing large diameter PCCP water mains in the vicinity of a city water reservoir. To protect these sensitive and critical lines, chemical soil grouting was specified to stabilize the water mains and a tunneling method was used to construct the storm sewer. Additionally, a settlement protection plan with survey benchmarks was employed to monitor any settlement in the vicinity of the water mains.

With the Knox Avenue and American Boulevard intersection closure in the middle of October, **construction crews worked 24 hours-a-day for four days through inclement weather to meet a 10-day maximum closure requirement** for this high-volume intersection. Intense coordination was required between the contractor, the city, and private utilities to complete water, sewer, and storm sewer construction through a myriad of private utilities, including gas, fiber optics, traffic signal controls, and a large electrical duct bank while ensuring street restoration so the intersection could be open for the upcoming holiday shopping season.



The project had a substantial completion date of June 30, 2019. Thanks to the innovative construction management techniques mentioned in the above section, this date was met as planned.

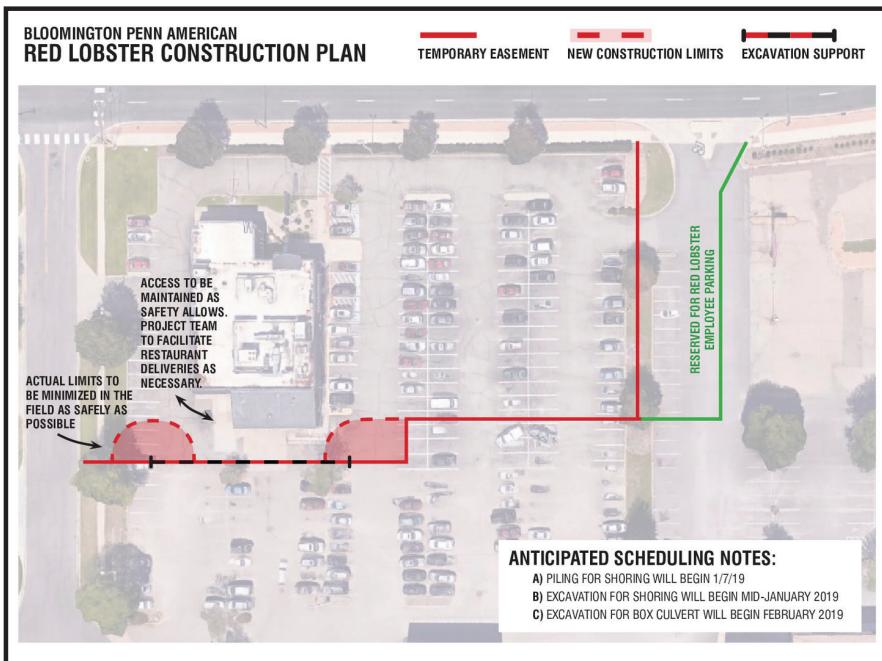
Safety Performance

During construction, safety in confined spaces was a priority. All site workers were required to complete OSHA's Confined Space Entry Training and adhere to specific steps as they were working both above and underground. Maintaining focus on proper protocol and best practices was part of the contractor's daily routine.



The post-construction walk-through

was another significant safety accomplishment. **Upon completion, six members of the project team—two city staff, two Bolton & Menk team members, and two contractor staff—walked the entire length of the underground culverts and storage array for final inspections.** In total, the team spent two hours underground traveling 5,000 linear feet of storm sewer. The contractor brought in a rescue resources team to assist with the effort, keeping track of air quality through monitors placed at each manhole along the path, maintaining emergency extraction readiness, and maintaining radio contact with those underground at all times. The above-ground crew was always at the nearest point of egress in case the inspection crew needed to be extracted for any reason.



Community Relations

One of the many businesses affected by the project was the Red Lobster on American Boulevard. This restaurant is widely recognized as the busiest Red Lobster in the state. To minimize impacts to the business as a result of the three months of adjacent construction between January and March, the city, the contractor, and Bolton & Menk, facilitated daily deliveries to Red Lobster and coordinated trash removal from their property. *On-site crews hauled anywhere from 200 to 500 boxes of food-per-week for Red Lobster deliveries.*

The American Boulevard and Knox Avenue intersection is dominated by car dealerships and restaurants—continuous access was needed to ensure traffic access to the Infiniti car dealership and Lucky's Restaurant. Special coordination routed traffic to these businesses through cooperative private properties. The neighboring Kia car dealership (which was also owned by Infiniti) was used to get Infiniti customers and employees to the property. The project team worked with neighboring businesses to ensure the access they expected was provided throughout the project.

Timely and accurate information regarding the construction process was crucial to this project's success. The team sent out a weekly email and provided weekly website updates to quickly and effectively distribute information to the public. Hard copy newsletters were sent to an adjacent apartment building that housed a large population of senior citizens.

Accomplishments Given Adverse Conditions

As mentioned previously, construction was able to continue through the winter months, including backfilling the large pipe network, by creating large backfill stockpiles on the adjacent demolished building site and selecting unfrozen backfill material from the stockpile. The large volume of excess excavated material created by the 12.2 acre-foot of underground storage allowed this selective backfilling technique. 2,600 feet of 12-foot CMP was successfully backfilled during freezing conditions by hand tamping the soil under the pipe haunches and using small compaction equipment in the three feet of separation between the CMP array. Larger compaction equipment was used once appropriate cover was placed on the CMP to backfill depths up to 20 feet in the winter.



The local public utility requested the abandonment of a 48-inch diameter PCCP watermain at the existing underground water storage reservoir. The issue was that the location where the new PCCP plug needed to be placed was 45 feet deep and within 15 feet of the underground reservoir footing. The contractor used slide sheet piling to access the pipe and the plug was installed, tested, and backfilled successfully after months of coordination and planning.



Environment/Sustainable Design Techniques

This area within the City of Bloomington has struggled with flooding for many years due to the undersized nature of its existing storm sewer system. The project team designed a linear conveyance and storage system that both relieved the existing flooding and ensured the downstream lake levels remained unaffected. The severe flooding problem near the Knox and American intersection was mitigated immediately without affecting the hydraulic characteristics of Upper Penn Lake.

This project met the needs of the city's MS4 and construction permits by allowing exfiltration through the box culvert. The double cell box culverts consist of two parallel chambers with connecting windows every 40 feet, allowing cross flow once the water elevation in the first chamber reaches three feet deep. When the water rises to the three-foot mark, it flows through the window into the next chamber which is connected to an outlet at the end of the 700-foot-long box system. The water on the upstream side of the connecting windows is available for infiltration through the open pipe joints. An external geotextile wrap was used to prevent fine sediment material from entering the joints of the double box culvert, ***not only allowing this project to mitigate flooding, it also provides water quality treatment.***





Future Value to Public Works Profession and Public Perception

Historic aerial photos of this area in Bloomington illustrate an original natural wetland at the intersection of Knox Avenue and American Boulevard that existed prior to any development. Development practices in the 1940s through the 1960s disregarded the long-term implications of increasing impervious surfaces and associated runoff to the area, leaving current city residents, monitoring public, and businesses with severe flooding problems. This Bloomington Public Works project retrofitted a sustainable solution that didn't simply "push the problems downstream." The resulting linear storage system is a substantial improvement to the adjacent property owners that were subject to flooding. It also removed a traffic safety issue where water used to pond up to three feet deep. Prior to the project, emergency services would close the road during significant rainfall events to prevent people from traveling through the deep water. 2019 has been a wet year with several rainfall events that would have typically resulted in area flooding. The city is happy to report no flooding incidents have occurred, even with events compared to a 10-year rainfall event.

This project also allows the Orange Line bus rapid transit project to come to fruition. The Orange Line has been planned to travel down Knox Avenue, with one of the pickup stations being within 100 feet of the major flooding areas. Without mitigating the flooding issue prior to construction, the success of the Orange Line may have been severely compromised. This streamlined service is now fully funded, and construction of the Orange Line began in the summer of 2019.

Upon completion of the stormwater project, redevelopment activity was initiated in the area during the fall of 2019 for the construction of nearly 250 workforce housing units. This furthered the city's vision for the Penn-American District as a high-density, pedestrian-friendly, and transit-oriented development.



Additional Considerations

Aside from a highly engineered project and highly skilled contractor, the city was able to develop a partnership with the Housing and Redevelopment Authority (HRA) and a land developer controlling much of the project property to allow the project to happen. The public works department worked with the HRA and a private developer, both of which had redevelopment interests in the area, and accommodated the improvements to ensure the linear storage project and future development were mutually compatible.

The City of Bloomington also partnered with 7 owners of 18 different properties to help fund the project through assessments totaling \$1.5 million. This accomplishment speaks to the public-private partnership that was necessary to make this improvement project happen. The city and property owners all participated in the funding and were in complete agreement with the ultimate assessments and the associated benefits that would be afforded.

