

## INTRODUCTION

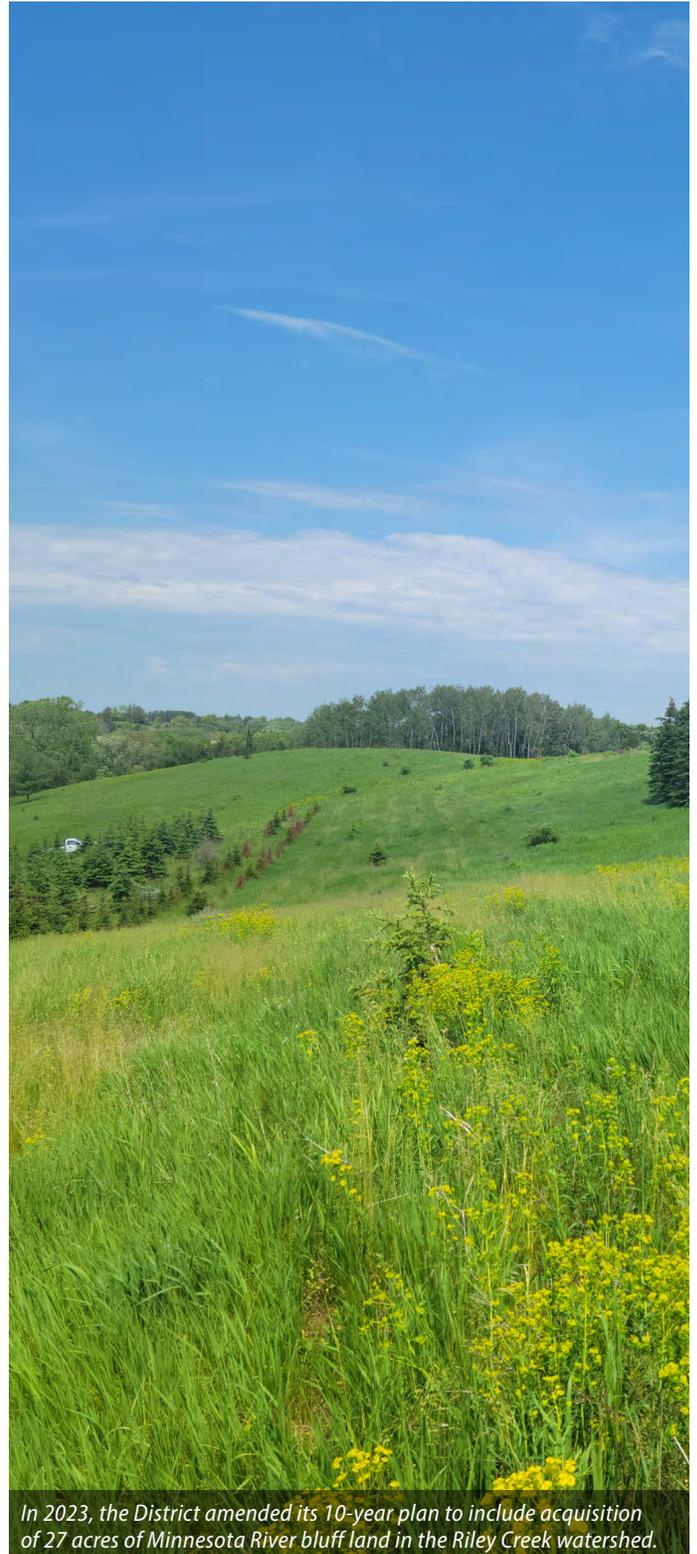
Several programmed projects got underway in 2023. Plans were finalized for the last portion of Riley Creek to be stabilized, from Highway 5 to Lake Susan. The Bluff Creek headwaters channel stabilization and ecological enhancement was ordered as well. The Lotus Lake watershed water quality improvement project feasibility study was completed.

The District also amended their 10-year plan to include the acquisition of 27 acres of prairie land in the lower bluffs area of the Minnesota River. This project met numerous plan goals and could potentially serve as the future location for the district office. After more than a dozen meetings to discuss the merits and detractors of this project, the Board of Managers voted 4-1 to acquire the project. The lone dissenting manager filed suit against the Board of Managers. The case was still pending as of February 2024.

The District also began their next planning initiative, Ecosystems Health Action Plan (EHAP), which aims to take a more holistic approach to watershed management, considering all biological, chemical, and physical characteristics of the watershed and the role they play in water quality.



*The first workshop of four of the EHAP Technical Advisory Panel was held in May 2023.*



*In 2023, the District amended its 10-year plan to include acquisition of 27 acres of Minnesota River bluff land in the Riley Creek watershed.*

# CAPITAL IMPROVEMENT PROJECTS

## LOTUS LAKE WATER QUALITY IMPROVEMENT PROJECT

Lotus Lake is classified as a deep water lake with a beneficial use category of Class 2: Aquatic life and recreation. The MPCA standard for total phosphorus (TP) less than or equal to 0.04 µg/L. Lotus Lake has only met this standard once between 1972 and 2018. Since Lotus Lake received an alum treatment in 2018, it has consistently met the standard with an average TP concentration in 2021 of 0.029 µg/L. The MPCA standard for chlorophyll-a (Chl-a) is at or below 14µg/L, and Lotus Lake has not met this standard in any year tested although it has been trending downward since the alum treatment. Based upon the [2017 Use Attainability Analysis \(UAA\)](#), internal loading accounts for 68% of the TP loads to Lotus Lake. A second alum treatment is planned for 2023, addressing the internal loading component. This internal load control is modeled to reduce annual loading approximately 586 pounds per year. In total, Lotus Lake needs a load reduction of 37% or 682 pounds.

The UAA identified eight potential locations for best management practices to treat the contributing watershed. In chapter 9 of the 2018 10-year plan, these projects were listed individually. It was decided while setting the 2022 budget that an economy of scale could result in a reduction of cost by

combining several of the practices into one larger project. To this end, LL\_1, LL\_3, LL\_5, and LL\_7 have been combined into one project and the feasibility study was initiated in 2022. Based upon planning level estimates, these practices could potentially reduce external loading to Lotus Lake by 122.9 pounds of TP per year.

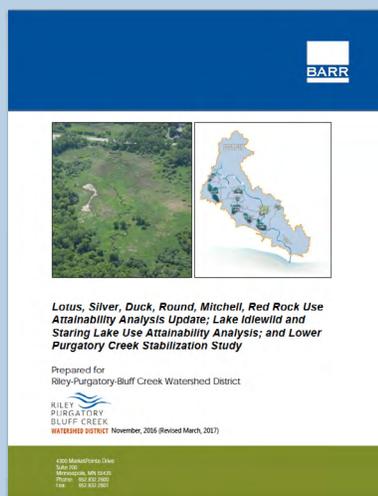
At the planning level for the UAA, these projects, in total, ranged in cost from \$2,896,000 to \$4,059,000. It is important to emphasize that this is at the planning stage and that range will narrow as the design is developed. Funding for the project is anticipated to come from the RPBCWD levy, the City of Chanhassen, and, if awarded, grant funds. The City of Chanhassen has three road reconstruction projects planned for the area in the capital improvement plan. RPBCWD and Chanhassen are working as partners to provide regional treatment for these planned activities.

The project feasibility study was completed in December of 2024. The feasibility report found that certain constraints to the various areas would limit the TP removal indicated by the planning level estimate. If all four practices are implemented, as well as the stabilization of Kerber Ravine, the annual TP loading to Lotus Lake would reduce by 57.3 lbs/year. This reduction, combined with the alum treatment, will bring the total load reduction to within less than 39 lbs/year of the target loading identified in the UAA. In addition to the reduction in total phosphorus loading to Lotus Lake, these projects will also reduce sediment load to Lotus Lake by more than ten tons per year.

A public hearing will be held in late spring of 2024 with an anticipated project order date in the early summer of 2024. When a project is "ordered" by the Board of Managers, it is not authorized for construction. What is ordered is for the design, permitting, and bid or quote solicitation to occur. Depending upon qualified bids, coordination of road projects, and property access, construction is anticipated to begin in the 4th quarter of 2024 with substantial completion occurring in late 2025.

### What is a UAA?

A Use Attainability Analysis (UAA) is a structured scientific assessment of the factors affecting the attainment of uses specified in Section 101(a)(2) of the Clean Water Act (sometimes called the "fishable/swimmable uses"). Factors considered include the physical, chemical, biological, and economic use removal criteria.



## BLUFF CREEK HEADWATERS ECOLOGICAL RESTORATION PROJECT

The District has partnered with the City of Chanhassen to stabilize Riley Creek from Highway 5 (MN TH5) to Lake Susan. The goal of the project, described in the [Bluff Creek Reach 5 Ecological Enhancement Plan](#) was to create an ecologically diverse stream corridor and significantly reduce streambank erosion and sediment deposition into Bluff Creek and the Minnesota River, both of which have Total Suspended Solids (TSS) identified as the stressor. The project will also provide extended detention and ecological restoration within the headwater wetland. Where constraints allow, the stream will be reconnected to the floodplain.

Bluff Creek is impaired for both aquatic life (2002) and aquatic recreation (2002 and 2018). A Total Maximum Daily Load (TMDL) Study was conducted in 2010 and identified in-stream and near-stream erosion as the primary sources of sediment. It further concluded that extended detention, such as will be provided by the wetland restoration, will aid in the reduction of erosive forces in the channel. In 2022, the Bluff Creek Reach 5 Ecological Enhancement Plan was completed. Conversations with the city of Chanhassen made the district aware that Chanhassen was planning on a full reconstruction of Galpin Boulevard. The district is working with Chanhassen to align these projects to the extent practical. One outcome of this communication was that the district advanced study of the creek crossing at Galpin Boulevard and designed a crossing that would not increase rates, velocities, or flood elevations while providing for animal migration. This design was provided to Chanhassen for inclusion in their reconstruction plans for Galpin Boulevard. The RPBCWD will pay for that portion of the culvert replacement that exceeds the delta of what the cost would otherwise have been for Chanhassen had they only sought regulatory compliance.

Modeling completed in 2022 indicates that flow rates and velocities can be reduced to pre-settlement conditions for the 1-year, 2-year, and 10-year return interval storms. This could translate into a reduction of 8,225 pounds of TSS and 31 pounds of total phosphorus (TP) in addition to the reductions resulting from the channel stabilization. The recommended channel

*Design of the Bluff Creek Headwaters Ecological Restoration Project is underway. The project will restore a section of Bluff Creek north of Highway 5.*



stabilization concept (Concept C) is estimated to reduce loading of TSS by 60,200 pounds per year and TP by 38 pounds per year.

Planning level cost estimates range from \$545,500 to \$848,600. As is always the case, planning level opinions of cost have a wide range because the specific design parameters are unknown. As the design becomes more resolved, the range will narrow. The project was ordered by the Board of Managers in December of 2023.

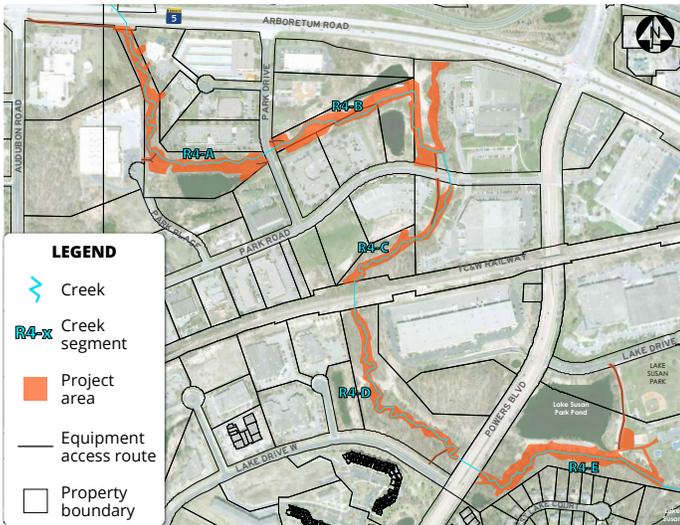
Design will continue through 2024. Bid solicitation is anticipated in late 2024 with construction to occur in 2025.

## UPPER RILEY CREEK ECOLOGICAL ENHANCEMENT PROJECT

The District has partnered with the City of Chanhassen to stabilize Riley Creek from Highway 5 (MN TH 5) to Lake Susan. The goal of the project, described in the [Upper Riley Creek Corridor Ecological Enhancement Plan](#), is to create an ecologically diverse stream corridor and significantly reduce streambank erosion in Riley Creek and sediment deposition into Lake Susan. Where constraints allow, the stream will be reconnected to the floodplain.

Riley Creek is impaired for both aquatic life (2002) and aquatic recreation (2002 and 2018). The receiving water, Lake Susan, is impaired for aquatic consumption, aquatic life, and aquatic recreation due to mercury, Fish Index of Biotic Integrity (IBI), and nutrients. The sampling performed where Riley Creek passes under Powers Boulevard found that all but two samples in 2018

The Upper Riley Creek Ecological Enhancement Project will stabilize Riley Creek from Highway 5 to Lake Susan.



and all of the 2019 samples exceeded the MPCA standard for total suspended solids (TSS) of  $\leq 30\text{mg/L}$ . Results of the P8 model indicate that 83,000 pounds (about 37,648 kg) of sediment are carried from the watershed to Lake Susan annually. This does not include loading from streambank erosion. To achieve and maintain the long-term water quality goals of Lake Susan, a 67% reduction in erosion source loading is necessary.

This reach, known as R4, was analyzed using the Bank Erosion Hazard Index and the Near Bank Stress Ratings. These tools were used to estimate bank erosion rates and were estimated at about 250 tons of total suspended solids (TSS) each year. By stabilizing Reach 4, engineers estimate the project will reduce TSS by 470,000 pounds per year and total phosphorus (TP) by 250 pounds per year. This represents the bank recession rate of 0.10 to 0.25 feet per year.

In 2022, the district performed a Phase I Environmental Site Assessment (ESA), and [Environmental Assessment Worksheet \(EAW\)](#), preliminary plan design, and hydrologic and hydraulic modeling of the reach. The EAW produced a finding of no recognized environmental conditions. The ESA found nothing of consequence as well. The design has been modified to achieve no rise in flood elevation as required by FEMA. Design was completed in October of 2023. The RPBCWD has partnered with the City of Chanhassen to address an outdoor storage area currently used by the city that lies immediately adjacent to Riley Creek and surrounding wetlands. Chanhassen

desires a decant facility to be constructed that would allow for deposit of materials such as street sweepings, slurry obtained through vacuuming out manufactured treatment devices and sump manholes, as well as other debris currently stored in the outdoor facility. Coordination with the city has resulted in a delay of the project timeline to work through design and logistics.

Late winter and early spring of 2024 will be spent finalizing design of the decant facility, developing and executed a cooperative agreement with Chanhassen, and procuring necessary rights from property owners with the work area. Solicitation of bids will take place in late summer of 2024 with construction tentatively scheduled for winter 2024/2025.

## RICE MARSH LAKE WATER QUALITY IMPROVEMENT PROJECT

Rice Marsh Lake is classified as a shallow lake. The MPCA standard for TP is  $\leq 60 \mu\text{g/L}$ . The average growing season total phosphorus in 2010 was  $115 \mu\text{g/L}$  with a peak of  $130 \mu\text{g/L}$ . In 2014 the average TP load concentration was  $107 \mu\text{g/L}$  with a peak of  $134 \mu\text{g/L}$ . The [2016 Rice Marsh Lake and Lake Riley Use Attainability Analysis \(UAA\)](#) found that 44% (712 pounds) of the load was from watershed runoff, 35% was from internal loading, and 19% originated from upstream lakes. To meet water quality goals, TP loading must be reduced by 41% or 681 pounds.

Rice Marsh Lake has a contributing local watershed of 883 acres. The selected subwatershed (RM\_12) accounts for approximately 232 of those acres including the highly urbanized town center of Chanhassen, which has minimal treatment. The area accounts for loading of one pound per acre or 232 pounds of TP. The next largest contributing subwatershed (RM\_33) accounts for 169 pounds. Most other subwatersheds are in the single digits.

The [Feasibility Report for the Rice Marsh Lake Subwatershed RM\\_12a Water Quality Improvement Project](#) evaluated seven different potential best management practices with one of these, manufactured treatment devices (MTD) looking at 14 different products. After meeting with Chanhassen staff of the Parks and Recreation Department and evaluating other site

constraints such as the Metropolitan Council Interceptor Sewer Line, it was decided to go with a manufactured treatment device (MTD). The Kraken® Filter by Bio Clean was the preferred option as it was modeled to have the best removal efficiencies at between 52 and 59 pounds/year as well as having the needed capacity to handle the storm event flows through the system. A sampling unit was placed into the outlet for the

At the feasibility stage, the engineer's opinion of cost for the project ranged from \$456,000 to \$854,000. The awarded bid was for \$594,830. Funding for the project came from the RPBCWD levy. Chanhassen paid for installation of the curb cut rain garden during their road project and to have an existing storm sewer utility access hole adjusted and refurbished. The city also donated land for the project and partnership with Chanhassen is in the form of their donation of land and their committed to long-term maintenance of the area and the MTDs.

Two filters were installed in series in November 2021. In spring 2022, another raingarden was installed, and 15,000 square feet of park area maintained as lawn had the soils amended and was planted with either pollinator plants or native prairie. There will be three years of ongoing vegetation management.

## MIDDLE RILEY CREEK STABILIZATION PROJECT

The District partnered with the Bearpath Golf and Country Club and the Bearpath Homeowners Association on this project. The goal of the project, described in the [feasibility report](#), was to create an ecologically diverse stream corridor and significantly reduce streambank erosion and sediment deposition into Riley Creek. In conjunction, the project needed to maintain the aesthetics and playability of the original Jack Nicklaus-designed golf course.

Riley Creek is impaired for both aquatic life (2002) and aquatic recreation (2002 and 2018). The receiving water, Lake Riley, is impaired for aquatic consumption, aquatic life, and aquatic recreation due to mercury, Fish IBI, and nutrients. Downstream, the Minnesota River is impaired for aquatic life and aquatic consumption.

Portions of this reach, known as R3 (extends from Rice Marsh

Lake to Lake Riley), were analyzed using the Bank Assessment for Non-Point Source Consequences of Sediment (BANCS) model, which is comprised of two erosion estimation tools. Based upon the Bank Erosion Hazard Index portion of the BANCS, these reaches rated as "high." By stabilizing Sub-Reaches E and D3, engineers estimate the project will reduce total suspended solids (TSS) by 16,640 pounds per year and total phosphorus (TP) by 8.3 pounds per year.

At the feasibility stage, the engineer's opinion of cost for the project ranged from \$504,000 to \$819,000. The awarded bid was for \$439,582. Funding for this project came from the RPBCWD levy and the Bearpath Golf and Country Club. In 2021, the channel was realigned, all stabilization practices such as riffles, root wads, and vegetated reinforced soil slope (VRSS) were installed, and the flood plain area has been temporarily stabilized. The spring of 2022 saw the remainder of the buffer areas planted into native vegetation. This will be the last year of vegetation maintenance by the district before turning that responsibility over to Bear Path Golf and Country Club.

## SILVER LAKE WATER QUALITY IMPROVEMENT PROJECT

Silver Lake is classified as a shallow lake, which has an MPCA standard for total phosphorus (TP) less than or equal to 60 µg/L. Silver Lake has only met this standard in 2017. The District set a goal for chlorophyll-a (Chl-a) at or below 20 µg/L, and Silver Lake has not met this standard in any year tested. Based upon the [2017 Use Attainability Analysis](#), TP loads to Silver Lake need a reduction of 16% or 179 pounds.

The [Feasibility Report for the Silver Lake Subwatershed SIL\\_2 Water Quality Improvement Project](#) identified five potential best management practices to treat the contributing watershed. Installation of a drop manhole structure with sump, channel reshaping, and installation of an iron-enhanced sand ditch check was selected to minimize cost, disturbance to the natural area, and potential utility conflicts. Based on estimates, the project will remove 2.6 to 4.7 pounds of TP per year.

During the feasibility study, the engineer's opinion of project



cost ranged from \$98,000 to \$183,000. The awarded bid was for \$127,977. Additional erosion was noted just beyond the construction limits and a change order was authorized to extend the curb and gutter and repair the eroded area for \$4,111, bringing total project cost to \$132,088. Funding for the project came from the RPBCWD levy with change order paid for by the City of Chanhassen. The City also partnered by donating land for the project and committing to long-term maintenance of the sump manhole and iron-enhanced sand filters.

The project was substantially complete in November 2021. Fall of 2024 will mark the completion of the three years of contracted vegetation maintenance.

## WETLAND RESTORATION AT PIONEER TRAIL

Initiated as a flood hazard mitigation project, the project evolved into a wetland restoration project. The City of Chanhassen and RPBCWD purchased three houses that were constructed in an historic wetland and experienced regular flooding. The structures were removed from the property, either by home movers or demolition, and their appurtenances also removed. Upon removal of the homes, RPBCWD commissioned a [Feasibility Report – Pioneer Trail Wetland Restoration Project](#), to determine what ecological, flood protection, and stream protection benefits could be garnered from restoring the wetland on these three properties. The feasibility report looked at two outlet configurations for hydrologic and hydraulic control

as well as two conceptual plans for habitat restoration.

At the feasibility stage, the engineer’s opinion of cost for the selected options ranged from \$400,000 to \$650,000. The awarded bid was for \$295,098. Funding for the project came from the RPBCWD levy, the City of Chanhassen, a Minnesota Department of Natural Resources Flood Hazard Mitigation Grant, and Watershed Based Funding Grant from the State of Minnesota. In 2021, the outlet structure was installed and earthwork was completed. Invasive species were treated as well. In the spring of 2022, the final treatment of invasive species was completed and in the summer of 2022 the wetlands were sown with native seed mixes and live container shrubs and trees were installed. There will be professional maintenance for a minimum of five years. Volunteers will be asked to perform additional maintenance into the future.

## DUCK LAKE ROAD PARTNERSHIP

For many years, Duck Lake Road divided Duck Lake into two separate bodies of water. The separation negatively impacted water quality and wildlife habitat and caused frequent flooding of the roadway. In 2019, the City of Eden Prairie applied for a permit to reconstruct Duck Lake Road. This project evolved into construction of a bridge to replace the section of road dividing the lake.

The project replaced approximately 235 feet of two-lane roadway with a bridge and pedestrian improvements.

Environmental benefits include restoration of the shoreline and about 7,000 square feet of the lake bed, removal of habitat



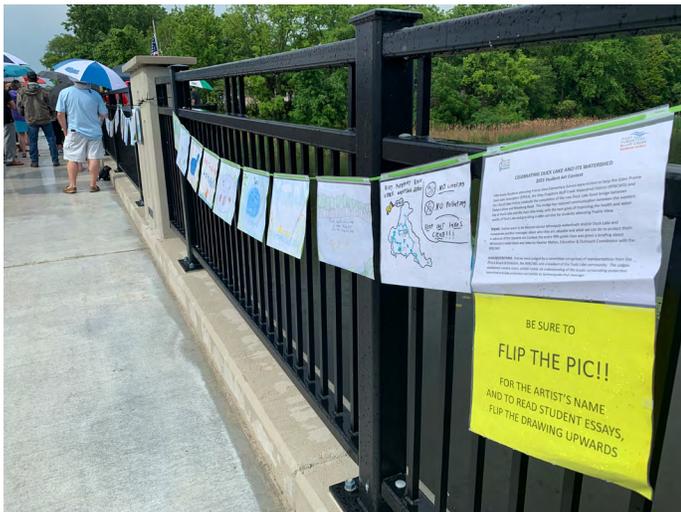
*A double row of yellow silt curtains in the water protect the lake from the Duck Lake Road construction zone (fall 2021).*

fragmentation, and improved floodplain impacts by increasing the water storage volume of the lake.

Total project cost is approximately \$4.7 million over five years with the District providing up to \$1.175 million in support. The project was constructed entirely on city property, and the city will own and maintain Duck Lake Road and its right-of-way when the project is complete.

Project construction began in 2021 with substantial completion in late 2022. The official opening ceremony was held in June 2023. For more information, check out the City of Eden Prairie [Duck Lake Road Improvement Project webpage](#).

*The City of Eden Prairie hosted a Ribbon cutting ceremony for the Duck Lake bridge on June 1, 2023.*



## ST. HUBERT WATER QUALITY AND NATIVE VEGETATION RESTORATION PROJECT

This project was a public/private partnership between the District, St. Hubert Catholic School, and Carver Soil and Water Conservation District (SWCD). The project germinated from a school staff member's desire to install a raingarden for her classroom as a project to address runoff from the school's parking lot that had created a deeply incised gully had formed within a tributary to Rice Marsh Lake. The project evolved to address the gully, install a rain garden, install a tree trench, restore 0.6 acres of fallow land to prairie, as well as make some drainage improvements on the site. In addition to the water quality benefits, RPBCWD staff are working with staff at St. Hubert to develop curriculum to turn the prairie into a living classroom. The school and RPBCWD are also working with a class at the University of Minnesota to study soil health and vegetation establishment at the site.

A [memorandum of conceptual design](#) was prepared to communicate conceptual design options, approximate costs, as well as benefits and limitations of specific practices. The preliminary opinion of cost ranged from \$204,000 to \$277,000. The awarded bid was for \$290,964. Funding is from the RPBCWD levy, St. Hubert Parish Council, the State of Minnesota Watershed Based Implementation Fund, and Carver SWCD. The



*A view of a St. Hubert project tree trench in October 2022.*

project was substantially completed in August of 2021. Three years of maintenance remains on the prairie, rain garden, and tree trench.

## SPRING ROAD CONSERVATION PROJECT

This project originated out of a significant grassroots upwelling. The area was deemed to be a priority area for protection by the RPBCWD. The RPBCWD ten-year plan was updated to include the Spring Road Conservation Project on November 16, 2023. A public hearing was held on October 16, 2023. This project will protect and restore approximately 27 acres of highly erosive bluff land in the Riley Creek and Minnesota River valleys. In addition, the acquisition will allow for targeted education and outreach opportunities, will add one of two remaining properties needed to complete a contiguous natural corridor from Lake Riley to the Minnesota River, will aid in meeting the TMDL for both waterways, and will provide opportunity for research. The area may also be used to house the RPBCWD offices in the future.

Acquisition is tentatively scheduled to occur in 2024. The RPBCWD will work with Hennepin County Land and Water to develop a restoration plan and restore the native dry prairie and savanna ecotypes in late 2024 into 2025.

