

While a suitable method for calculating the pre-project contribution of sediment to the stream due to down-cutting was not used (no erosion rate data was available), the project engineer estimated the project area to contribute approximately 50 tons per year. The 6 riffle/pool structures are calculated to store 2663 tons of total sediment, thereby preventing an additional 133 tons per year from moving down the watershed.

The total calculated reduction in sediment loading to the stream for the project is 196.2 tons per year. The original project goal was to reduce stream sediment in the project area by 25%. The estimated actual reduction in stream sediment loading is 61.3%. Photos of several of the completed structures are provided below.

All calculations assumed a 20-year design life for the project features.

Calculations of sediment contribution to the stream were determined using the Watershed Sediment Delivery Calculator model as recommended by Iowa Department of Agricultural and Land Stewardship. Calculations of sediment storage provided by the Riffle/Pool structures were provided by the project engineer.



Practices Summary

Practice	Unit	Approved Application Goal	Accomplishments	Percent Completion
Streambank Stabilization	Ft.	815	815	100
Riffle/Pool	No.	6	6	100

A watershed map showing the locations of the streambank stabilization and riffle/pool structures is attached (Exhibit 1).

Program Accountability

When the project began, there was an active Kettle Creek Watershed advisory group consisting of local elected officials, watershed residents and land owners, agency natural resource staff, city engineering and public works staff, and consulting engineers and biologists. Other watershed

activities included a major upgrade of local storm water systems, construction of soil conservation structures in the agricultural portion of the watershed, and the construction of Ottumwa's first rain garden demonstration project. Watershed activities have been well received and attended by the public and media. Several project articles appeared in the Ottumwa Courier (see attached Exhibits 2-5).

Unfortunately, as the project matured, many of the partners finished their respective watershed activities and moved on to other priorities. Some elected officials and staff members moved on to other interests and the watershed advisory group no longer meets regularly.

Exhibit 1: Map of completed structure locations.

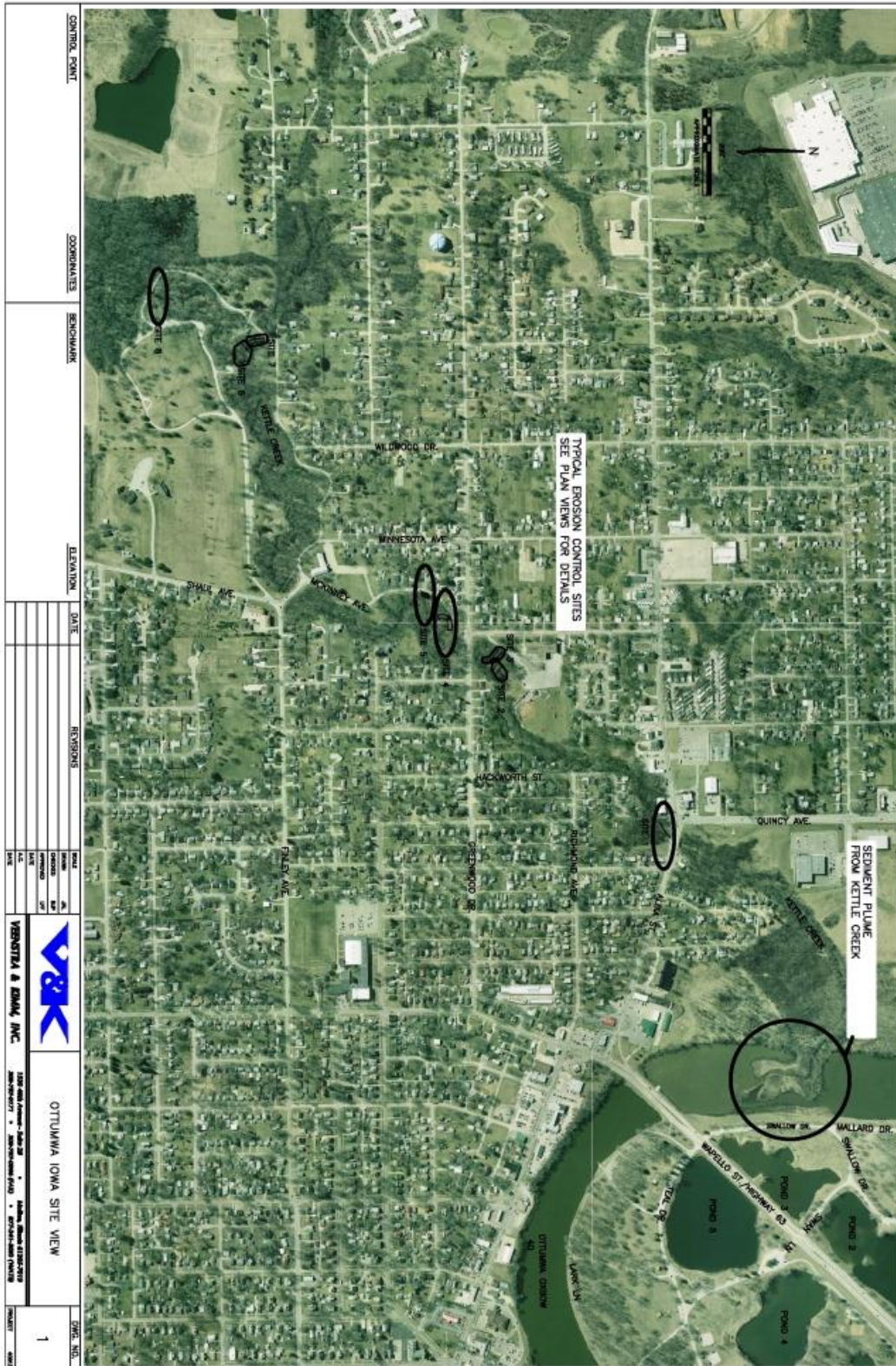


Exhibit 2: Project media article.

The Ottumwa Courier

March 25, 2009

Work continues on Kettle Creek

Officials hope to finish ag structure soon

BY CINDY TOOPES COURIER STAFF WRITER

OTTUMWA — Drop by drop, the rainfall rushes to the lowest level and picks up silt along the way in the Kettle Creek Watershed.

Those raindrops have flowed along Kettle Creek and left so much silt in the Oxbow Lagoon that it looks like land.

During the past few years, local and state officials have been working on Kettle Creek Watershed projects.

Jennifer Steffen works for the Wapello County Soil & Water Conservation District and is the watershed coordinator for Kettle and Competine creeks. She said they're still working on the engineering for the largest structure that will slow down the raindrops before they enter Kettle Creek and flow into the city.

The agriculture land structure will be on Gene Carlson's property and they're still working on the details, Steffen said Tuesday.

"We hope to have construction this summer," she said. "It's a grade stabilization structure that will slow down the water and provide detention before it goes into the urban portion of Kettle Creek."

A grade stabilization structure could be called a big pond. The structure slows down the water as it goes through a tube before it leaves.

"It's a method to slow the water and make it drop its sediment before it flows into the creek and into the lagoons," Steffen said.

The county soil and conservation district has also been working with Wayne Petersen, the urban conservationist with the Iowa Department of Agriculture and Land Stewardship.

Steffen said Petersen was in Ottumwa recently and visited the sites of several businesses and "other entities" in Kettle Creek's urban area including the new Fareway Store, Good Samaritan Center, Wildwood Park, Wildwood School and Bethany Baptist Church.

Petersen is preparing concept plans to take to landowners, according to Steffen. Those plans include conservation practices that "will cause water to infiltrate and percolate down through the soil for bioretention," she added.

"We're working on those plans and hope to present them in the next few weeks," Steffen said.

"Impervious areas" have had an impact on the city. Ottumwa Public Works Director Larry Seals dealt with those in computing fees for the storm-water utility plans rejected by the Ottumwa City Council in recent months. Impervious areas don't allow water to soak in so it runs off those surfaces, which include parking lots.

Seals presented a grant agreement to the council on March 3. The agreement involves the Iowa Watershed Improvement Review Board and the city concerning the Kettle Creek Watershed improvements.

In March 2008 the city was approved for a \$387,996 WIRB grant for Kettle Creek improvements. The purpose of the agreement is to note the responsibilities of the board and the city in implementing the project.

The contract will allow up to three years to complete the project. Seals said the city will build two of the structures with city staff, as part of in-kind services.

"The goal of the project is to reduce the urban sediment load contributed to Kettle Creek from bank sloughing and stream downcutting," he added.

Total estimated cost of the project is \$595,412.

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Exhibit 3: Project media article.

The Ottumwa Courier

December 31, 2009

Kettle Creek will get more help

Council OKs agreement with Griggs of Boone

BY CINDY TOOPES, Courier staff writer

OTTUMWA — More plans for helping the little creek that tries to solidify were approved this week by the Ottumwa City Council.

The “little creek” is actually Kettle Creek, which enters the city in the Wildwood Park area and empties into part of the city’s oxbow lagoon.

Plans to stop the silt from migrating are part of an Iowa Watershed Improvement Review Board (WIRB) grant administration agreement between the city and Griggs Environmental Strategies, LLC, of Boone.

“The purpose of the agreement will be to prepare project administration, planning and reporting documents for submittal to the WIRB,” Public Works Director Larry Seals noted in his report to the council.

Seals also said the city was approved for a WIRB grant in the amount of \$387,996 for the Kettle Creek Watershed Improvements Project. Setting up the plans and reports won’t exceed \$34,330 over a three-year period.

As a state board, WIRB funds water quality protection projects through local watershed improvement committees and soil and water districts. The board also protects the state’s surface and ground water “from point and non-point sources of contamination.”

Mayor Dale Uehling is a liaison to the Kettle Creek Committee. He said an example of point pollution would be a septic tank or some other specific place, such as a wastewater treatment plant.

Non-point pollution would be storm-water runoff from farms and feedlots, he added.

“As for the grant, there’s the planning work but there’s also other contracts to be let for the physical work, such as stabilizing the banks of Kettle Creek,” Uehling said. “And the rain garden at Bethany Baptist Church is part of it.”

He said the rain garden collects storm water from the church’s parking lot and filters it before it gets into Kettle Creek. Also, some farmers have storm-water structures on their land.

“It’s not just the city; it’s in the county, too, and the whole watershed,” Uehling said. “We have four structures out there as well.”

Griggs will help design and lay out “what needs done,” according to Uehling.

“[City staff] has a general idea of what needs done but Griggs knows the certain guidelines and strict procedures reporting,” he said. “Griggs will work on that and the actual construction projects as well.”

What will they build?

Uehling said one plan includes riprapping to “protect the banks of Kettle Creek from erosion.”

“When the land is fairly wet and we have a heavy rain, the creek floods and the banks erode and silt comes from the banks,” he said. “We’ve got to stop the siltation.”

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Exhibit 4: Project media article.

The Ottumwa Courier

August 26, 2010

Rain gardens can ease storm-water woes

Gardeners Club hosts web program about water management at IHCC

CINDY TOOPES
Courier Staff Writer

OTTUMWA — Can a truckload of water disappear into the street before it ever reaches a storm drain?

Members of the Wapello County Master Gardeners Club know following a program Wednesday at Indian Hills Community College.

The webcast program, “Rain Gardens in Iowa,” included a brief video of the truckload of water that vanished after it hit the street.

Ann Marie VanDerZanden said the street must be made with the right pervious materials. She is with Iowa State University’s Department of Horticulture.

“Pervious” means “allowing passage through.” Hundreds of gallons of water splashed onto the roadway and disappeared in a minute.

She also said the road material’s texture might remind people of a rice cereal treat.

A California company that makes the product used the same analogy on its website, stating the concrete is porous like the treat and allows rain water to flow through it.

“When rain water hits the concrete it collects oils and other impurities on the surface and filters them out as the water flows through the concrete and into the earth below to recharge precious groundwater supplies,” the company — Enviro-Crete, Inc., of Rio Linda — said. “This also reduces the need for storm-water sewers and retention ponds, which saves space and money for developers.”

Does pervious concrete work in Iowa’s winters?

VanDerZanden said the special concrete “tends to work” in colder temperatures; but, if a city uses sand for ice control, then the concrete won’t work as well because sand plugs up the special porous structure of the concrete.

She also said pervious concrete “isn’t maintenance free.” Cities often use a vacuum to remove the sand.

Rain gardens

Gardeners also learned about the design and maintenance of rain gardens for storm-water management in a hardscape, or urban setting.

“Not all rain gardens are pretty,” VanDerZanden said.

That’s why some people think a rain garden is a bog.

“Water issues are a major concern, especially in the Midwest,” VanDerZanden said. “Both quality and quantity are issues. A rain garden and its native perennials and grasses won’t cure everything but it can mitigate water damage.”

Stan Rooker, a Master Gardener, said Bethany Baptist Church has a rain garden that parallels the church’s parking lot. When rain runs off the lot’s concrete, it then flows across the “grassy area” between the lot and the street.

While the grassy area isn’t flashy, the plants there slow down the rain water so more of it soaks into groundwater and less raindrops carrying soil get into nearby Kettle Creek.

Runoff pollution is another problem, and people are trying various ideas such as a spout that guides rain water away from a home’s foundation and into a trough-like structure that released the water into the street.

Rain gardens have a berm around one edge, and the berm captures the water. If properly sited and constructed, the garden will drain in about 48 hours.

Watershed Improvement Project Final Report (7042-016)

“A rain garden isn’t a mosquito breeding area,” VanDerZanden said. “Mosquitos need seven to 12 days of standing water. A rain garden is an example of green infrastructure. But, it’s not adequate to solve all water problems in the cities.”

How to be a Master Gardener

Jean Dell said anyone can join the Wapello County Master Gardeners Club, which meets the first Monday of every month. Those interested take training and do 40 hours of volunteer work.

“Our function is to help people with plant materials, which could impact the well-being of the community in visual and functional ways,” Dell said.

For information, contact ISU Extension Service’s Wapello County office, 214 E. Main St., from 8 a.m. to 4:30 p.m Monday through Friday. Call 641-682-5491 or e-mail xwapello@iastate.edu.

Exhibit 5: Project media article.

The Ottumwa Courier

November 2, 2009

Bethany Baptist Church to have rain-garden structure

Church is near Kettle Creek, has impervious areas

BY CINDY TOOPES, Courier staff writer

OTTUMWA — Rain drops speeding across the Bethany Baptist Church parking lot will hit a slow zone by next year.

Located at 201 McKinley Ave., Bethany Baptist Church is not only in a bend of Kettle Creek but also has a large roof and parking lot. Across the street are four homes with large roofs.

All that adds up to a lot of moving water when it rains.

Jennifer Steffen is the watershed coordinator with the Wapello County Soil & Water Conservation District. She said the church has agreed to a rain garden structure and a crew began work Monday morning on one side of the “green space” area on church property.

Those working on the project include the Wapello County Soil & Conservation District, the city of Ottumwa and Bethany Baptist Church. The city workers on site were part of a sewer crew.

Steffen said workers will strip the dirt for the rain garden structure, which will be 184 feet long and 10 feet wide. When finished the structure will be parallel to and just as long as the church’s parking lot.

“[The rain garden] is designed to capture the runoff from impervious areas, such as concrete,” she said. “There’s 27,000 square feet of impervious area here.”

The rain comes down the roof and joins the runoff flowing across the concrete parking lot. After the rain garden is ready, those drops will leave the concrete and encounter the rain garden and the obstacles, or “slow-downs” the structure provides above and below the ground.

“We’ll also have a berm on the downhill side and a seven- to nine-inch ponding area where the rain drops will gather and percolate down through,” Steffen said.

Below ground, there will be layers of specified soil mix, native/natural soils, washed concrete sand and a foot or so of washed rock and subdrain.

Steffen said workers will put in 1 1/4-inch layer of rock, followed by layers of coarse sand, then sand mixed with compost. There will also be a pool below that will slow down the rain going through the storm sewer and across the street to Kettle Creek.

“On the very top of the rain garden, we’ll have native grasses,” Steffen said. “Later, the Wildwood School students will help us plant 1,840 ‘plugs.’”

Plugs are small plants about 1-2 inches wide and 4-6 inches long.

“This is a wonderful green space here,” Steffen said as she watched Robin Fitzsimmons use a track hoe to break ground for the rain garden.

Kettle Creek originates 1.5 miles south of Ottumwa and travels north and east through the city. It empties into an oxbow lake in Ottumwa Park.

Watershed Improvement Project Final Report (7042-016)

The creek's watershed is 1,048 acres and it drains 633 acres of agricultural land and 415 acres of urban land.

The creek's water-quality problems stem from high sediment loads caused by overland runoff in the form of sheet and rill erosion, erosive gullies resulting from stream down-cutting and urban storm water drainage from the city.

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