January 13, 2011

Jerry Neppel and WIRB Board
Wallace State Office Building
502 E. 9th Street
Des Moines, IA 50309

RE: 9028-014 Tributary B to Fourmile Creek in Ankeny, Iowa
Final Report

Enclosed is the Final Report for the Stormwater Retrofit Project for Tributary B/Summerbrook Park in Ankeny.

If you have any questions about any of the information within this document, please do not hesitate to contact me at 515.963.3520 or by email at abryant@ankenyiowa.gov.

Sincerely,

Amy L. Bryant, P.E.
Civil/Environmental Engineer

Enclosures

FINAL REPORT

Stormwater Retrofits at

9028-014 Tributary B to Fourmile Creek
Ankeny, Iowa
April 15, 2010 – December 15, 2011

January 13, 2011

TRIBUTARY B TO FOURMILE CREEK
ANKENY, IOWA
9028-014

PROJECT SUMMARY
I. NARRATIVE

The vision for this project was to take the entire 281-acre drainage area and try to reduce the quantity and improve the quality of stormwater that leaves Tributary B at SE Delaware and enters into Miller's Pond on the east side of SE Delaware and eventually flows into Fourmile Creek. We tried to focus not only on abutting properties to the stream, but on individual parcels within the watershed. Our intent was and is to improve the inputs that Ankeny has to Fourmile Creek. We used a three-phased approach process for this project. The three phases included a targeted public education program, a streambank restoration, and additional stormwater retrofits installed at Summerbrook Park.

A map demonstrating the locations of the new features within Summerbrook Park is included in Appendix A.

II. PUBLIC OUTREACH

An important aspect of this project was to really focus on public education and involvement. We focused on the watershed specifically, but also included all interested Ankeny residents. Here are some of the public outreach activities that were completed throughout the project:

A. During the preliminary watershed assessment, prior to the grant application, meetings were held in 2008 and 2009 to gather feedback from the neighbors.

B. Meetings were held to discuss the project and gain temporary easement permission with the neighbors in 2011, prior to the grant application.

C. Details about the project were provided at the Polk Soil and Water Conservation District (SWCD) event, 'Backyard Conservation' held at DMACC on February 27, 2010. General details were provided and a watershed map was on display. Information regarding stormwater BMPs was distributed. Approximately 20 people discussed the project at this event.

D. A mailing went out entitled "You live on waterfront property" to watershed residents. The mailing invited them to attend a public meeting regarding the project. A copy of the mailing is included in Appendix B.

E. A public meeting to kick off the project was held on May 19, 2010. During this meeting, we talked about the watershed assessment report completed on the area, the grants awarded, and our approach for the project. We talked about what a watershed is and what homeowners could do on their property to make a difference regarding stormwater quantity and quality. Jennifer Welch from Polk SWCD discussed these ideas. Mark Land from the engineering firm, Snyder and Associates, was also on-hand to discuss the project. We talked about the next steps of the project and also gave details on the Stormwater Best Management

Practices (BMP) Reimbursement Program the City was piloting. Materials on stormwater BMPs were available. Approximately 50 people attended the event. Watershed and proposed project detail maps with funding partners were on display.

F. During the public meeting, residents were asked to provide their email address as a way to keep up to date on the project. Emails were sent regarding the progress of the project, as well as opportunities to attend stormwater educational workshops or involvement opportunities at Summerbrook Park. Twenty-two residents joined the email list. The city of Ankeny website also has a place where residents can sign up for e-notify to be alerted if information comes out on Tributary B. Sixty-four residents signed up to receive information on e-notify. Periodic updates were sent regarding the project.

G. A Rain Garden Design Workshop was held on August 24, 2010. This free course described what rain gardens are and how to incorporate them into residents' yards. Approximately forty people attended the event. The information for this course was distributed by email list, e-notify, in a press release that appeared in the Ankeny Register, and on the City's website.

H. A 'How to Improve Your Lawn Workshop' was held on March 30, 2011. Approximately 30 people attended the event. The event was presented by city of Ankeny staff and discussed practices people could do to improve their lawns in a way that is cognizant of the environment and stormwater. At the event, soil quality restoration was also described. The information for this workshop was distributed by email list, e-notify, in a press release that appeared in the Ankeny Register, and on the City's website.

I. An informative article was written and published in the Ankeny Register on June 10, 2011. The article detailed the construction activities that were to happen in the park and also provided tips for homeowners to address stormwater on their own property. A copy of this article is included in Appendix B.

J. An article was published in the summer 2011 Ankeny Report describing the construction at Summerbrook Park and how it will benefit water quality. The Ankeny Report is a newsletter distributed to postal customers within the 50021 and 50023 zip codes. The Ankeny Report is also available online through the City's website, and copies are available at city offices after initially being distributed by mail. A copy of this article is included in Appendix B.

K. A public event was held to allow neighbors and other interested Ankeny residents to install the plants within the new bioretention cells along SE Delaware Avenue. The event on May 18, 2011 drew about 15 people.

L. A tour of stormwater features at Summerbrook Park was held on October 11, 2011. This walking tour presented information on the porous asphalt trail, native landscaping, bioretention cells, stream restoration, and native buffer installation. Stops were also made at a residential rain garden and a porous asphalt driveway. Neighbors of the park, Stormwater Stakeholder's Group members, and other interested individuals attended the event.

M. Four large educational signs have been developed for installation at Summerbrook Park by the end of 2011. There is an overview sign, a streambank restoration

sign, a bioretention cell sign, and a porous asphalt/native landscaping sign. Smaller signs include 'Prairie in Progress' signs and signs that point out the native landscaping beds. An electronic version of the signs are located in Appendix C.

N. A tour of the new stormwater features at Summerbrook Park for the Ankeny Park Board was held on October 31, 2011. The tour was attended by the seven park board members and the Director of Parks and Recreation.

O. As part of the education process, we tried to encourage residents to install best management practices on their own property. To date, fourteen known stormwater features have been added within the Tributary B watershed during the grant period.

FINANCIAL ACCOUNTABILITY

The following table indicates money spent to date in conjunction with this project.

Task	Contract Amount	WIRB % Cost-share	Total Cost	WIRB Amount	Total Task Cost	WIRB % Cost-share
1) Education Signs	$2,400	50%	$4,540	$2,140	$4,540	50%
2) Permeable Pavement	$10,800	50%	$24,900	$10,800	$24,900	43%
3) Bioretention Cell	$7,200	19%	$53,327	$7,200	$53,327	14%
4) Weirs	$38,400	100%	$38,400	$38,400	$38,400	100%
5) Streambank Stabilization	$111,000	86%	$98,601.07	$98,601.07	$194,412.40	51%
TOTAL	$169,800			$157,141.07	$315,579.40	

Funding Source	**Contribution**
WIRB	**$157,141.07**
IJOBS	**$100,000**
Polk SWCD	**$17,000**
Metro Waste Authority	**$10,000**
City of Ankeny	**$251,882.57 ($12,000 in-kind included)**
TOTAL	**$536,023.63**

Watershed Improvement Fun Contribution: **Approved application budget:** **41.5%**
Actual: **29.3%**

ENVIRONMENTAL ACCOUNTABILITY

IV. CONSTRUCTION ACTIVITIES BY PRACTICE

The following section includes details on each practice that was installed along Tributary B and at Summerbrook Park. It includes pre- and post-practice photographs and also details the environmental accountability.

A. STREAMBANK RESTORATION

A cost-effective and aesthetic creek restoration was completed. A riffle-pool system consisting of five weirs was installed for grade control to reduce the stream slope and lower velocities. These weirs have a low profile and are utilized for erosion protection and sediment control. In conjunction with the weirs, two stream barbs divert flow direction and provide additional bank protection. Four areas of toe protection, with very limited grading to reduce impact to trees, were completed. Bank shaping was completed to provide connectivity to the flood plain. One area of bank protection in Summerbrook Park provided stabilization to an eroded bank that was greater than 10 feet high. Outfall stabilization was provided to control erosion in areas where stormwater discharges to the main creek. Deep-rooted vegetative buffers were seeded along the streambanks replacing the turf grass. Red-osier dogwood live stake plantings, which are the placement of woody plant cuttings on a graded bank to grow and stabilize the bank by the formation of roots and above ground growth, were planted in selected locations along the streambank.

The criteria for this design was to reduce channel flow velocities, to reduce the hydraulic slope and establish a wider cross section where feasible, reduce erosion by shaping bends to reduce velocity, minimize impact to trees, avoid disturbing areas that are relatively stable or experiencing minor erosion, and incorporate vegetative and buffers (soft-armoring) to increase stream stability over time. It also included sloping back tall banks to achieve stable slopes, reducing undercutting at banks below tree and other vegetation roots by lowering velocities, placing toe protection, promoting deep-rooted plants, reducing flow undercutting potential, and establishing flow transitions that increase stability. This plan designed for soil and other site–specific characteristics, design for ease of maintenance, and design with materials that are flexible, adaptive, and sustainable. Erosion control measures were put into place during construction activities to limit the amount of sediment traveling downstream during construction.

Before Pictures of Tributary B

Bank showing erosion and leaning trees.

Another view within Summerbrook Park.

Before Pictures of Tributary B

Sediment deposition and eroding banks.

A view in the park looking west.

Photographs of the streambank restoration

Clearing and grubbing within Summerbrook.

More clearing and grubbing.

Stream restoration work in the park.

Completed channel work in the park.

Photographs of the streambank restoration

First phase behind resident's houses.

Working in backyards in upper reach.

Working behind resident's houses.

Area restored, ready for seeding/live stakes.

Tributary B during the first significant rain event after completion on October 12, 2011.

Tour of the park on October 11, 2011.

Practices Installed	Approved Goal	Percent Complete
Weirs	5 weirs	100%
Streambank Stabilization	1,000 linear feet	100%

Practice	**TSS Ton/year**	**% TSS Reduction**
Streambank Restoration	25.5 tons/year	24.99 (98% reduction)

B. STORMWATER RETROFIT FEATURES AT SUMMERBROOK PARK

Stormwater retrofit features were added to Summerbrook Park that can serve as a model for homeowners and city officials alike. Prior to this project, the park had a playground, swings, walking trail, basketball court, gazebo, and picnic areas. The park has a rolling topography with the stream section bordered on each side by the park. The stream is at the lowest elevation in Summerbrook Park. Now a native buffer, four native planting beds, two bioretention cells, a porous asphalt trail, and educational signage are also incorporated into the park. More details on each feature are described below.

1. NATIVE BUFFER/NATIVE PLANTINGS

To create beauty, habitat, provide additional water capacity in the soil and slow and infiltrate overland flow, a native buffer that extends 30 feet on the southern and higher bank and extends from 40 to 60 feet on the northern and lower side of the stream corridor was installed. The buffer is greater on the northern side because that is where the natural flood plain occurs and this will provide a better connection between the stream and flood plain as the elevations on the north are closer to the stream. The native plantings will also extend up the natural drainage swale that travels down the hill towards the creek to slow and infiltrate stormwater. A native planting bed will be located just above the basketball court to infiltrate stormwater sheeting down the hills and help with drainage issues on the court. Approximately one acre of native plants will be planted in these areas.

Photographs of the native landscaping 'Basketball Bed'

Basketball bed in fall 2010 just after planting.

Basketball bed in spring 2011.

Photographs of the native landscaping 'Basketball Bed'

Flowers in basketball bed in summer 2011.

More flowers in summer 2011.

Photographs of the native buffer seeding

Native buffer seeding in fall 2011.

Native buffer seeding in fall 2011.

A second area of native demonstration planting beds was located installed at the southwest corner of SE Delaware Avenue and SE Eighth Street. The three beds are designed to demonstrate the heights of different plants. It has shows a bed with a shorter variety of plants, a bed with mid-height variety of plants, and a bed with taller variety plants. The purpose of these beds is to show residents different plants they can incorporate into their own landscapes.

Photographs of the native landscaping demonstration beds

Installation progressing on three beds.

Short and medium beds in progress.

Photographs of the native landscaping demonstration beds

Shorter variety bed completed.

Taller variety bed completed.

Practices Installed	Goal	Percent Complete
Native Landscaping Beds/Native Buffer	~1 acre	100%

Practice	Additional Storage Volume Added
Native Buffer	162,925 gallons/foot depth of stormwater volume added

This impacts approximately 5½ acres of the watershed.

2. PERVIOUS PAVEMENT TRAIL

A pervious section of porous asphalt was installed at the southwest corner of SE Delaware Avenue and SE 8th Street. The trail is eight feet wide and has a 12-inch deep rock base. The trail provides stormwater infiltration instead of allowing water to sheet off of it. Its location near a standard sidewalk and area of standard asphalt will provide educational opportunities to demonstrate the differences (water ponding versus infiltrating) and similarities (ease of use) between the two.

Photographs of the porous asphalt trail installation

Gravel bed below the porous asphalt trail.

Porous asphalt trail installation.

Photographs of the porous asphalt trail installation

Porous asphalt trail close up immediately after installation.

Porous asphalt (left) versus standard asphalt (right) in right picture.

Practices Installed	Approved Goal	Percent Complete
Permeable Pavement	8,000 feet^2	100%

Practice	Additional Storage Volume Added (Gallons)
Permeable Pavement	1,995 gallons available per event

3. BIORETENTION CELL

Two bioretention cells were installed at Summerbrook Park within the right-of-way along SE Delaware Avenue. The first is two connected cells that are ten feet wide by sixty-four feet long. The second cell is ten feet wide by thirty-six feet long. The bioretention cells provide a total area of 1,000 square feet. The stormwater from SE Delaware is diverted into the cells utilizing curb cuts. The biorentention cells were planted with a variety of native plants appropriate to the conditions and will provide three-seasons of bloom color. The chosen locations are highly visible and traveled heavily by vehicles, by pedestrians, and by other trail and park users. The bioretention cells were designed using the Iowa Rain Garden Manual. The bioretention cells each have an overflow device, an Agri-Drain, which discharges into an existing storm sewer intake. Agri-Drains were installed in each cell to be able to collect samples of the water that has filtered through the cell. The Agri-drains can also be adjusted to set the water level in the cell before it drains to the storm sewer. Appendix D includes diagrams of the bioretention cells.

Photographs of the South Bioretention Cell

Construction activities looking south.

Start of digging on south cell.

South cell with engineered soil mix.

Compost and sand ready to be mixed.

Photographs of the North Bioretention Cell

North cell during excavation.

Drainage tile installation in gravel layer.

Photographs of the North Bioretention Cell

Up-close image of Agri-Drain.

North cell with engineered soil mix.

North cell being planted.

Completed north cell.

Practices Installed	Approved Goal	Percent Complete	Area Treated
Bioretention Cell	1 cell	200%	0.23 acres

Pollutant of Concern	Volume of Water Treated Annually*	Amount/year	Reduction
Total Suspended Solids	205,714 gallons	0.0867 tons/year	0.0694 tons/year (80%)
Nitrogen	205,714 gallons	3.26 pounds/year	1.63 pounds/year (50%)
Phosphorous	205,714 gallons	0.66 pounds/year	0.43 pounds/year (65%)

Table calculated utilizing the Iowa Stormwater Management Manual, including preliminary stormwater concentrations from Section 2S-1, Table 1, page 5. Removal rates were from Section 2E-4, page 8, and the lowest or most conservative value was utilizing in calculating the percentage of reduction.

*This is a high estimate and assumes area drains into and is treated by the bioretention cells. (33 inches of annual rainfall over 10,000 square feet drainage area)

Practices Installed on Private Property	Number
Rain Barrel	10 rain barrels (~75 gallons each)
Rain Garden	2 installed

VI. WATERSHED MONITORING

Watershed monitoring was instituted at the start of Tributary B at SE 8th Street, in the middle reach of the stream, and just upstream of the culvert in the lower reach of the stream. A map of the monitoring locations is included in Appendix E. The purpose of each sample is to determine upstream inputs from the watershed and see what enters the stream due to erosion and land management uses. These areas were monitored weekly during the stream restoration portion and monthly after impact to the stream was completed. We will continue to monitor at the most downstream location on a monthly basis.

In addition, with the easier access to the stream channel, we hope to provide learning opportunities for the public to participate in future sampling and/or educational events.

Due to an extremely dry summer, sampling points were checked but samples were unable to be collected due to flow conditions. The samples were collected utilizing IOWATER parameters and sampling equipment. The sampling results are compiled on the next pages.

Upstream Reach of Tributary B

Date	Transparency	Temperature (Celsius)	pH (standard units)	D.O. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Chloride (mg/L)	Notes
6/17/11	60	16.6	8	8	0	5	0.1	52	
6/20/11	60	17.1	8	8.58	0	2	0.2	<33	
6/27/11	60	17.3	7.9	9.52	0	5	0	45	
7/5/11	60	18.5	8.2	7.47	0	5	0.1	59	
7/12/11	60	19.3	8	6.73	0	5	0.1	75	
7/18/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
7/29/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
8/3/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
8/18/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
9/15/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
10/27/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low

Middle Reach of Tributary B

Date	Transparency	Temperature (Celsius)	pH (standard Units)	D.O. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Chloride (mg/L)	Notes
6/17/11	60	17.7	8	8	0	5	0.1	52	
6/20/11	60	18.2	7.7	7.66	0	2	0.2	<33	
6/27/11	60	17.5	7.6	8.16	0	2	0.1	45	
7/5/11	60	18.5	7.5	7.39	0	5	0.1	45	
7/12/11	60	19.7	7.6	6.84	0	10	0.2	52	
7/18/11	60	23.9	7.8	6.43	0	0	0.1	52	
7/29/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
8/3/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
8/18/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
9/15/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low
10/27/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low

ns = no sample collected

Downstream Reach of Tributary B

Date	Transparency	Temperature (Celsius)	pH (standard Units)	D.O. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Chloride (mg/L)	Notes
6/16/11	60	15.7	8	8.8	0	5	0.1	33	
6/20/11	60	18.4	7.9	8.24	0	2	0.2	<33	
6/27/11	60	18.1	7.9	9.08	0	5	0.1	39	
7/5/11	60	19.5	7.8	7.8	0	5	0.1	45	
7/12/11	60	20.8	7.9	7.29	0	5	0.1	45	
7/18/11	60	25.4	7.9	6.71	0	0	0.2	45	
7/29/11	54	24.4	7	2	0	1	0.4	32	
8/3/11	17	22.2	8	2	0	0	0.3	32	
8/5/11	5	ns	ns	ns	ns	ns	ns	ns	transparency test during a rain event
8/18/11	3	20.9	7.7	3.6	0	0	0	39	
9/15/11	60	10.8	7.8	4.0	ns	ns	0	39	
10/27/11	ns	ns	ns	ns	ns	ns	ns	ns	water level too low

ns = no sample collected

Results:

As expected, during construction the sampling results showed decreased transparency values at the downstream sampling location. After the majority of streambank restoration work was completed, the transparency result increased once again.

Overall Total Load Reduction – All Practices

Source	Amount Reduced	Units
Sediment	25.06	Tons/year
Nitrogen	1.63	Pounds/year
Phosphorus	0.43	Pounds/year
Stormwater	164,920	Gallons Added of Storage Capacity

VII. FUNDING PARTNERS

This project was funded by many different agencies in addition to the City of Ankeny. They include:

IJOBS/IDNR
Watershed Improvement Review Board (WIRB)
Polk Soil and Water Conservation District/Fourmile Creek Watershed/IDALS
Metro Waste Authority

We are thankful to these organizations for the impact they have created towards stormwater quantity and quality in Ankeny, but also the educational opportunities the changes afforded to us.

VIII. PROGRAM ACCOUNTABILITY

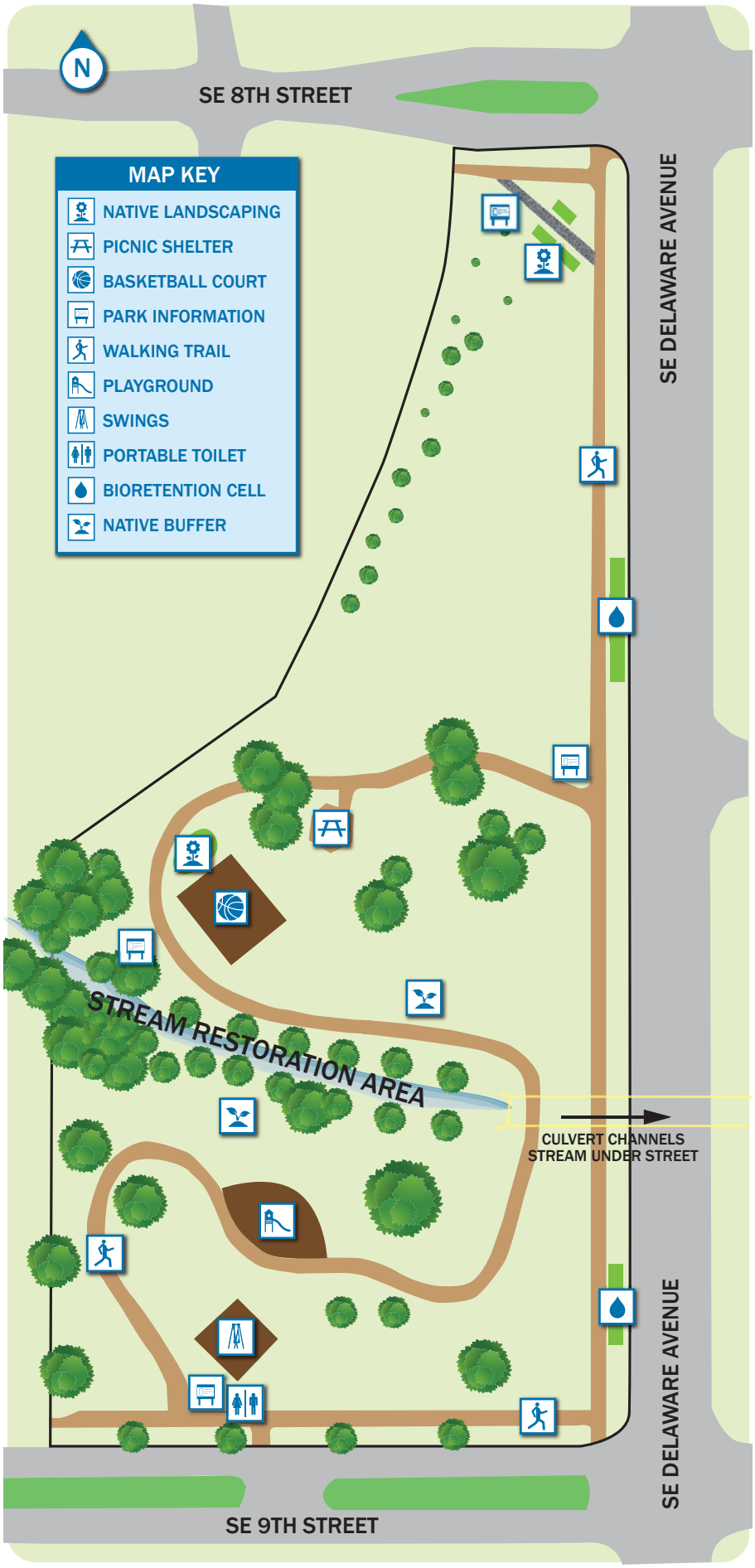
There were many activities planned as a part of the overall watershed improvement project that helped the overall goals of this project. That includes providing educational events, hosting an open house, planning hours, providing email communication, and adding educational signage. Some challenges were weather-related delays and the lack of products (rip/rap and sod). Recommendations are to allow extra time for contingencies outside what is expected within the normal range of construction activities. Educational events and tours, face-to-face contact with residents, and a good project manager/contractor go a long way in promoting good will.

An opportunity for improvement or replication is the ability to show an example of the practices that you are trying to complete within your project. Communication is key! Also, making sure maintenance plans or care and instruction plans are provided is important for future success. Additionally, when completing projects in an urban watershed, getting at least one neighbor on board is a good way to communicate information and have a champion of the project in the neighborhood.

APPENDIX A
MAP OF SUMMERBROOK PARK

Summerbrook Park

SE Delaware Avenue & SE 8th Street, Ankeny



APPENDIX B
EDUCATIONAL INFORMATION

Ankeny

The City of Ankeny has an ongoing effort to grow greener everyday. Throughout the city, more and more residents are doing their part to preserve and protect the environment. *The Ankeny Report* will periodically provide updates and ideas for recycling, conservation and environmental preservation.

NEW FEATURES AT SUMMERBROOK PARK WILL IMPROVE AREA WATER QUALITY

During the summer, construction at Summerbrook Park along SE Delaware Avenue made improvements to Tributary B and added stormwater features to the park. The vision for the project is to reduce the quantity and improve the quality of stormwater that leaves Tributary B and eventually flows into Fourmile Creek. The focus remains on abutting properties to the stream, but also on each parcel within the watershed. To improve the inputs that Ankeny has to Fourmile Creek, the city is using a three-phased approach: a targeted public education program, a stream bank restoration and additional stormwater retrofits located at Summerbrook Park.

The public education phase will provide residents within the watershed (or area that drains to Tributary B) and throughout Ankeny with information on how to manage stormwater on their properties. Educational programs including an IOWATER training course, a rain garden training course and lawn care improvement courses have been offered for residents. More events, including tours of the city's stormwater features and another rain garden training course are being planned.

In May, volunteers helped plant the bioretention cells, often known as rain gardens with native plants. These bioretention cells will divert water from SE Delaware by temporarily holding it, giving it a chance to infiltrate into the ground and cleansing the stormwater of the sediment and other pollutants collected on the road.

The restoration of Tributary B included shaping the banks, widening the channel and adding rock riffles in the stream to prevent erosion. These features will help slow the water down and reconnect the stream to the floodplain. Trees and native plants will be added to stabilize the shore. A native landscaping buffer, predominantly made of flowering plants, will be planted along the stream, adding beauty and habitat to the park. A great benefit of these native Iowa plants is their root structure that helps infiltrate water into the ground instead allowing water to flow on top. Additionally, the buffer will attract many species of butterflies.

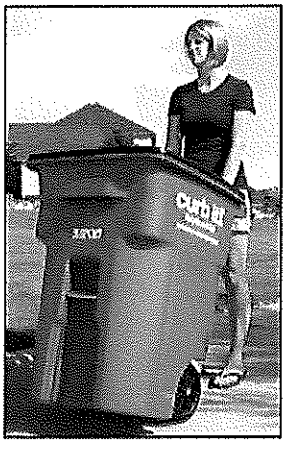
There will be four landscaping beds planted with plants native to Iowa. One bed was planted last fall and is near the basketball court. The other three beds are designed with short, medium and tall plants, respectively, and will be planted later this year. By planting demonstration beds, people can see the possibilities of what they could grow in their own yards. Near the three native beds, there will be a porous asphalt trail. This trail material allows water to soak into the ground instead of sheeting off, as is standard in traditional concrete or asphalt trails.

While the native plants can take three years to become fully established, construction is scheduled to wrap up in the fall. Once completed, the park will serve as a model for residents, informing them on how to address stormwater on their own property in a way that is not only functional, but very beautiful.

Grants received from I-JOBS, the Watershed Improvement Review Board (WIRB), Polk Soil and Water Conservation District and Metro Waste Authority are helping fund these stormwater improvements.

RECYCLING IN 2010 SETS CITY RECORD

With the single stream recycling program in place for nearly two years, Ankeny continues to increase its contribution to the program's success in Central Iowa. Recycling volumes have increased by 4,000 tons since the single stream program started. In comparison, it took nearly 13 years to increase recyclables by 5,000 tons under the old bin system.



In 2010, Ankeny residents recycled 3,132 tons, with over 80% of that being paper products. That's equal to:

- Removing 2,530 cars from the nation's roads
- Eliminating the energy use of 365 homes
- Saving 11,927 barrels of oil and 553,110 gallons of gasoline
- Preserving 10,338 cubic yards of landfill space
- Saving 43,406 trees from being cut down

Keep up the good work Ankeny!

NEW RECYCLING OPTIONS FOR LOCAL BUSINESSES & APARTMENT RESIDENTS

RecycleMe Iowa is a doorstep recycling service providing convenient, affordable access to recycling. Apartments, small businesses, condominiums, and events can now be green without breaking the bank.

Here's how it works: 1) contact RecycleMe Iowa at either info@recyclemeiowa.com or 515-650-1664 to sign up for services; 2) recycle items like paper, plastic, glass and aluminum; and 3) RecycleMe Iowa will pick up the containers, leaving fresh ones for next time. For apartments, a cloth bag in provided for glass and a paper bag in provided for everything else. Cost is $10 per month. For businesses, a representative will consult individually to personalize the service and fulfill green initiative needs.

Have a big event coming up that you want to 'be green'?. RecycleMe Iowa can help by bringing out containers for things like plastic water bottles and educate the public on what can be recycled, composted and what should go to the landfill. For a small cost, going green couldn't get any easier!

6/10/11

Water quality and quantity focus of projects

Although the work along Southeast Delaware Avenue is wrapping up, as the summer progresses there will be ongoing construction work at Summerbrook Park, making improvements to Tributary B and adding stormwater features to the park.

The vision for the project is to reduce the quantity and improve the quality of stormwater that leaves Tributary B and eventually flows into Four Mile Creek. The focus remains on abutting properties to the stream, but also on each parcel within the watershed.

To improve the inputs that Ankeny has to Four Mile Creek, the city is using a three-phased approach:

- A targeted public education program.
- A streambank restoration.
- Additional stormwater retrofits located at Summerbrook Park.

The public education phase will provide residents within the watershed (or area that drains to Tributary B) and throughout Ankeny with information on how to manage stormwater on their properties.

Educational programs including an IOWATER training course, a rain garden training course and lawn care improvement courses have been offered for residents. More events, including tours of the city's stormwater features and another rain garden training course, are being planned.

The City Council has authorized repairs to the stream corridor along Tributary B, with work to begin mid-summer. The restoration of Tributary B will include shaping the banks, widening the channel and adding rock riffles in the stream to prevent erosion.

These features will help slow the water down and reconnect the stream to the floodplain. Trees and native plants will be added to stabilize the shore.

A native landscaping buffer, predominantly made of flowering plants, will be planted along the stream, adding beauty and habitat to the park.

A great benefit of these native Iowa plants is their root structure that helps infiltrate water into the ground instead allowing water to flow on top. Additionally, the buffer will attract many species of butterflies.

There will be four landscaping beds planted with plants native to Iowa. One bed was planted last fall and is near the basketball court. The other three beds are designed with short, medium and tall plants, respectively, and will be planted later this year.

By planting demonstration beds, people can see the possibilities of what they could grow in their own yards.

Near the three native beds, there will be a porous asphalt trail. This trail material allows water to soak into the ground instead of sheeting off, as is standard in traditional concrete or asphalt trails.

On May 18, the public was invited to plant the bioretention cells, often known as rain gardens, with native plants. These bioretention cells will divert water from Southeast Delaware by temporarily holding it, giving it a chance to infiltrate into the ground and cleansing the stormwater of the sediment and other pollutants collected on the road.

While the native plants can take three years to become fully established, construction is scheduled to wrap up in the fall. Once completed, the park will serve as a model for residents, informing them on how to address stormwater on their own property in a way that is not only functional, but very beautiful.

Grants received from I-JOBS, the Watershed improvement Review Board, Polk Soil and Water Conservation District and Metro Waste Authority are helping pay for these stormwater improvements.

Every little bit helps. What you can do:

- Add a rain barrel
- Put in a rain garden
- Plant native landscaping
- Point downspouts toward your yard and off hard surfaces
- Keep lawn clippings and yard waste away from the street,
- Use fertilizer without phosphorous or not at all
- Pick up after your pet

To keep up to date, you can sign up for e-notify on the city of Ankeny website at www.ankenyiowa.gov. If you would like more information about this project or stormwater in general, you may contact Amy Bryant at 963-3520 or by email at abryant@ankenyiowa.gov.

— Submitted by the city of Ankeny

WEDNESDAY, MAY 19TH from 7 to 8 PM

YOU LIVE ON WATERFRONT PROPERTY!

What: An Open House about the Tributary B watershed (which you are in!) and Summerbrook Park improvements.

When: Wednesday, May 19th from 7 to 8 pm

Where: Public Services Building, Conference Room A, 220 W. 1st Street

Why: Find out what it means to live on waterfront property, learn about the Summerbrook/Tributary B project, see what you can do to help stormwater on your property, and learn what funding is available!

RAIN BARRELS, RAIN GARDENS,
NATIVE LANDSCAPING,
PERVIOUS SURFACES

city of Ankeny
bringing it all together

Amy Bryant
963-3520,
abryant@ankenyiowa.gov
220 West 1st Street
Ankeny, Iowa 50023

Funding for this
project provided by:

Watershed Improvement Review Board

APPENDIX C
EDUCATIONAL SIGNS

Prairie In Progress

Bioretention Cell

A bioretention cell and its plantings help to cool, cleanse and slow the flow of stormwater.

Native Buffer

A native buffer is the zone of native grasses, shrubs and trees that grow next to a stream. Native buffers create good habitat for many species of animals and insects by providing food, shelter and a travel corridor.

Native Landscaping

Tall Plant Species

Native Landscaping

Medium Height Plant Species

Native Landscaping

Short Plant Species

Native Landscaping

Bioretention Cells

You Are Overlooking SE Delaware Avenue and a Bioretention Cell.

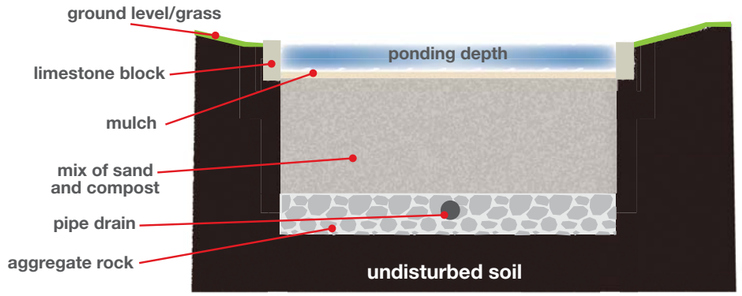
city of Ankeny
bringing it all together

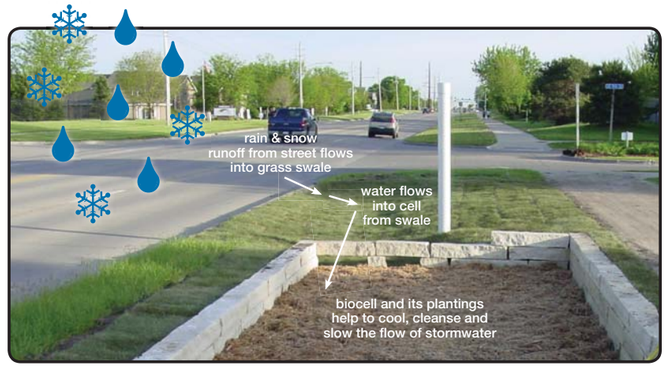
What is a Bioretention Cell?

What is a bioretention cell, sometimes called a biocell? Bioretention cells are designed to treat polluted stormwater from a road, parking lot, or off the roof of a building. Here at Summerbrook Park, the bioretention cells were constructed to accept stormwater runoff and snow melt off SE Delaware Avenue. The water gets into the cell through a curb cut and flows into the grass channel. Underneath the grass is a flow transition mat that helps the grass stay in place and prevents erosion. The bioretention cell helps cool, cleanse, and slow down the stormwater coming off the road.

Before this bioretention cell was installed, all this stormwater went into Miller's Pond, and eventually Fourmile Creek, untreated. That means the hot water off the road, sediment, road chemicals, pollutants from yards, yard waste, and oil and grease from vehicles went right into the storm drain during any rainfall or snow melt!

How Does A Bioretention Cell Work?





How does this cell help make the stormwater better? Bioretention cells have an engineered and constructed subgrade. In this cell, there are twenty inches of aggregate (or rock) with a six-inch perforated drain tile running along the center. Above that, there are thirty inches of an engineered mix of soil that is 75% sand and 25% compost.

As you can see, the top of the cell is below the ground surface and surrounded by Iowa limestone blocks. The depth between the ground level and the top of the cell is called the ponding depth. This bioretention cell is designed to temporarily pond runoff generated by a rain event of 1¼ inches or less. This area allows stormwater to collect in the cell, pond, and then have a chance to percolate down into the cell and surrounding soil. The water that ponds here is expected to infiltrate within 24 hours. Native plants with deep roots are installed here to maintain soil quality and help with percolation.

What's in the Box?

Photo courtesy of Agri Drain Corporation

The structure you see in the bioretention cell is a water elevation control device. By using it, we can adjust the amount of water that stays in the cell underground before it drains into the storm sewer.

The device has two purposes. First, by setting the water level higher in the cell, we can allow the filtered stormwater a longer time period to infiltrate into the surrounding, undisturbed soil. Second, the structure allows us to collect water samples from the bottom of the cell. By testing the water quality, we can determine which pollutants are removed as the stormwater filters through the engineered soil in the bioretention cell.

Add a Rain Garden

Take Home Project

What's the difference between a bioretention cell and a rain garden? The major difference between the two is a bioretention cell has an engineered subgrade of aggregate (or rock) and a tile line to ensure drainage. Rain gardens treat and infiltrate stormwater into the surrounding undisturbed soil. Rain gardens are usually smaller too.

A rain garden ponds water temporarily and the water then has a chance to infiltrate into the ground aided by the deep-roots of native plants. This helps decrease the quantity of stormwater that gets to our ponds and streams. It also can filter pollutants and sediment from the stormwater, improving water quality.

A rain garden can be located to intercept stormwater runoff from your driveway or off the roof of your house, garage, or shed. It can be planned to match the style of your house and surrounding landscaping. It is a garden that is beautiful, but also functional.

Native Plants

This bioretention cell is planted with plants native to Iowa for a couple of important reasons. First, they develop a deep root system, usually six feet or greater. The deep roots help build and maintain high organic content, as well as keeping the soil porous. The roots will also go deeper to find water during dry periods. Second, once established, native plants do not need to be watered or fertilized. The hearty, native plants thrive in our Iowa climate!

Monkey Flower

Royal Catchfly

Foxglove Beardtongue

Blue Flag Iris

Bee Balm

Welcome to Summerbrook Park!

Welcome to Summerbrook Park, one of Ankeny's stormwater conservation areas. Within this park you will find many ways that we are protecting water quality, whether restoring the stream channel to reduce erosion or adding a bioretention cell to cleanse and cool stormwater from SE Delaware Avenue. The City of Ankeny secured funding to help reduce the quantity and improve the quality of stormwater in this watershed. The vision of this project was to focus not only on abutting properties to the stream, but on each parcel within the watershed. The intent is to improve the water that leaves our yards, streets, and streams in Ankeny and enters Fourmile Creek.

Funding Sources

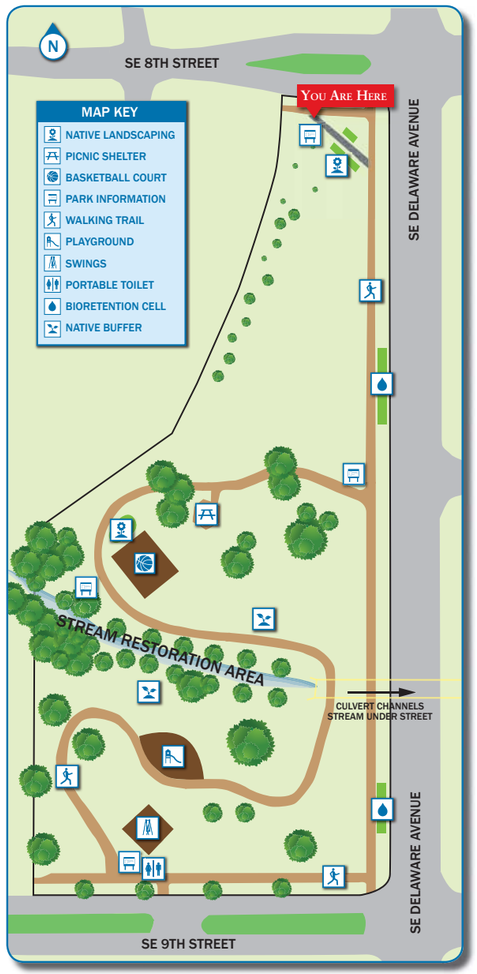
Fourmile Creek Watershed
Metro Waste Authority — Your Partner in Environmental Solutions
Iowa Department of Agriculture and Land Stewardship
DNR
city of Ankeny — bringing it all together
Polk Soil & Water Conservation District
WIRB Watershed Improvement Review Board
IJOBS Iowa's Infrastructure Investment Initiative

city of Ankeny
bringing it all together

Porous Asphalt & Native Landscaping

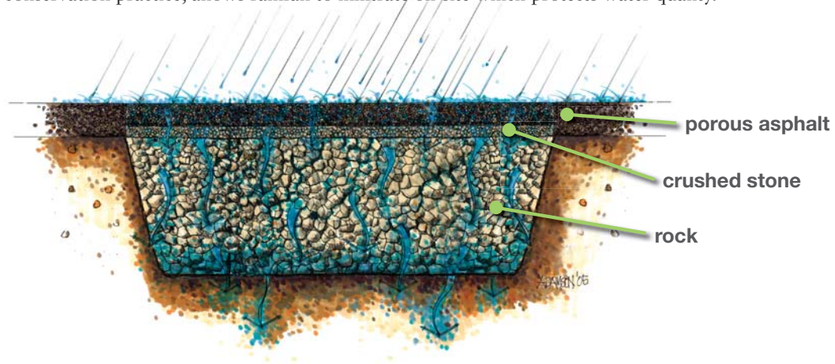
You are standing on a porous asphalt trail!

SUMMERBROOK PARK



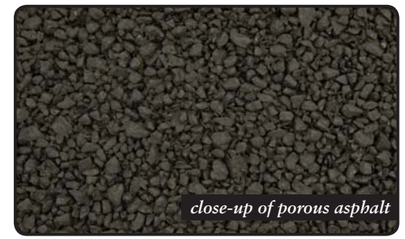
Porous Asphalt Trail

It looks like a regular trail, but look closer and see how is it different. Using porous asphalt, an urban conservation practice, allows rainfall to infiltrate on-site which protects water quality.



Fine rock particles are omitted from the traditional asphalt mix to create porous asphalt. This process leaves pore space in the pavement where stormwater can infiltrate into a deep rock base placed underneath.The rock base layer stores water until it moves into the soil and groundwater below. When rain water is allowed to infiltrate on-site, rather than flow through a storm sewer, the water is cleansed as it moves through the soil. It replenishes groundwater and is released slowly and naturally into Ankeny's ponds and streams.

Standard concrete sidewalk exists along SE 8th Street. When it rains, water sheets off of the sidewalk into the grass or down to the street. In contrast, the asphalt trail will absorb the water and infiltrate it back into the ground.


close-up of porous asphalt

Try This: Next time it rains, grab your umbrella and walk the two trails to compare and contrast them when it is raining.

Native Landscaping

History

Prior to development, Iowa's landscape was dominated by tall grass prairies. These prairie or native plants have deep root systems; in fact, most of the mass of the plant is below the ground. These deep roots add pore space in the soil profile. The process of roots growing, moving, dying, and decaying allowed the soil to become like a sponge, soaking in most of the rain that fell on it. These roots also gave Iowa the fertile soil it has today.

As Iowa's landscape converted to agriculture and urban areas, the ability of our landscape to infiltrate water decreased. Our urban soils are compacted by grading and are converted to impervious surfaces. Impervious surfaces are hard surfaces where water is unable to soak or infiltrate into the ground. This includes paved streets, parking lots, roof tops, and other hard surfaces.

Benefits of native landscaping in an urban environment

The use of native plants can help us connect to our prairie heritage. Once established, native plants don't require watering or fertilization. Native landscaping attracts songbirds, dragonflies, and butterflies. Most importantly, native landscaping will help restore soil quality over time, and help our urban landscapes absorb more rainfall and reduce the amount of runoff.


Harebells


Butterfly Milkweed


Indian Grass

Native Planting

Take Home Project

The three beds you see here at Summerbrook Park are planted with shorter, medium, and taller species of plants. These demonstration beds allow you to observe what the plants look like and how you can incorporate them into your own garden.

The next time you want to add a garden, try some native plants. Not only will they be beautiful, attract wildlife and require little maintenance, they will also provide function by infiltrating more stormwater.

For more examples and information on native landscaping, go to the Polk Soil & Water Conservation District website at www.polk-swcd.org.

Welcome to Summerbrook Park!

Welcome to Summerbrook Park, one of Ankeny's stormwater conservation areas. Within this park you will find many ways that we are protecting water quality, whether restoring the stream channel to reduce erosion or adding a bioretention cell to cleanse and cool stormwater from SE Delaware Avenue. The City of Ankeny secured funding to help reduce the quantity and improve the quality of stormwater in this watershed. The vision of this project was to focus not only on abutting properties to the stream, but on each parcel within the watershed. The intent is to improve the water that leaves our yards, streets, and streams in Ankeny and enters Fourmile Creek.

Funding Sources

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DNR
city of Ankeny — bringing it all together
Polk Soil & Water Conservation District
WIRB Watershed Improvement Review Board
IJOBS Iowa's Infrastructure Investment Initiative

Fourmile Creek Stream Restoration

You Are Overlooking Tributary B of Fourmile Creek.

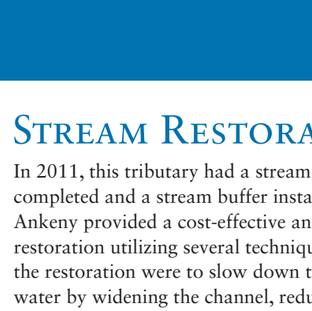
city of Ankeny
bringing it all together

Stream Restoration

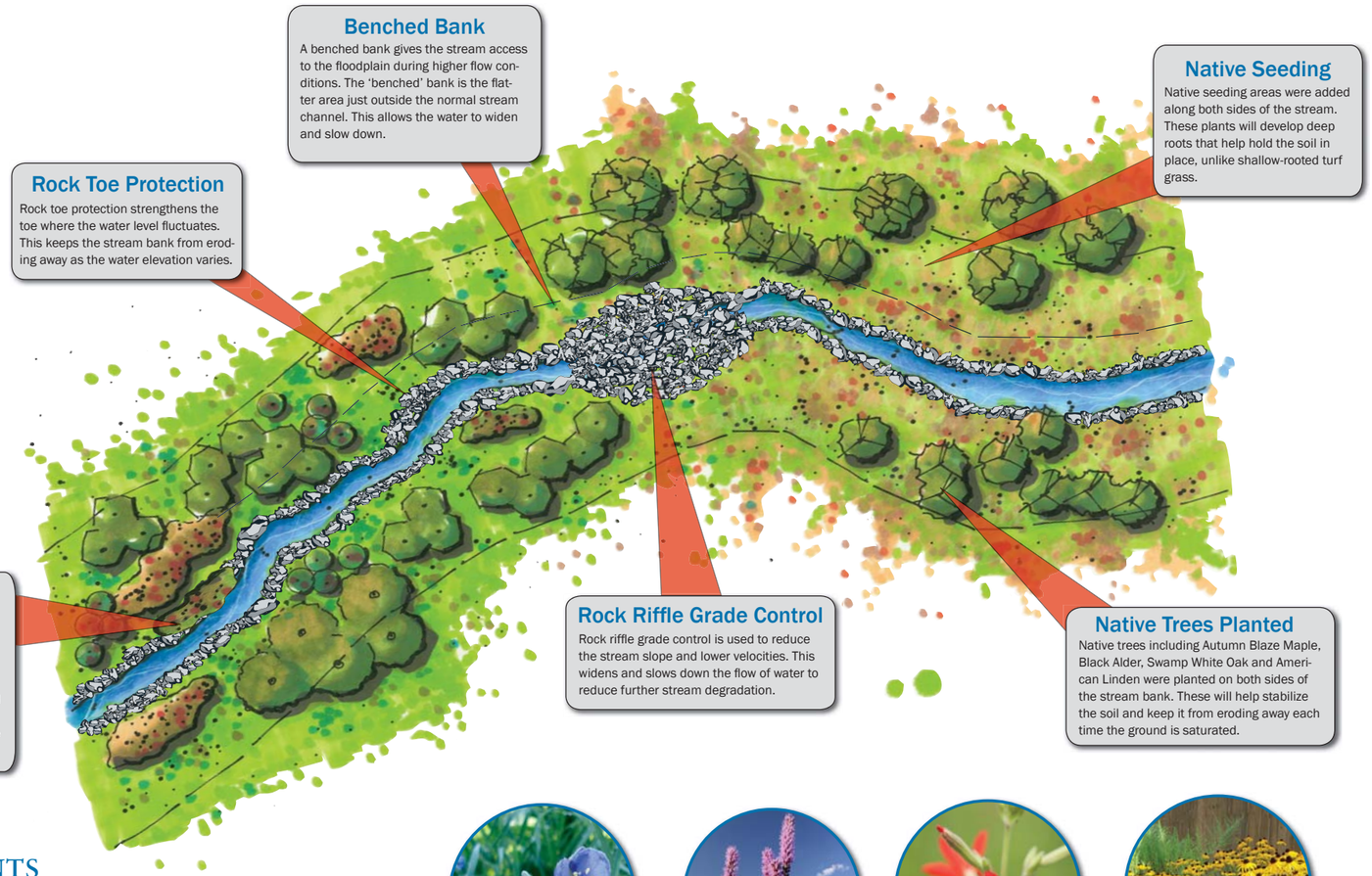
In 2011, this tributary had a stream restoration completed and a stream buffer installed. The City of Ankeny provided a cost-effective and aesthetic creek restoration utilizing several techniques. The goals of the restoration were to slow down the flow of the water by widening the channel, reduce erosion, protect and stabilize banks, protect existing trees where possible and add vegetated buffers to increase bank stability. Previously, stormwater runoff scoured the banks of the creek and washed soil into the water.

Native Buffers

A native buffer is the zone of native grasses, shrubs, and trees that grow next to a stream. Buffers protect natural resources, provide outdoor recreation and habitat, increase public safety, and lend character to a community. The complexity and diversity of healthy stream buffers create good habitat for many species of animals and insects by providing food, shelter, and a travel corridor.



Swallowtail Butterfly in Prairie Phlox



Native Plants

In this area of the park, you can observe many different types of grasses and flowering native plants. This includes: lanceleaf coreopsis, pale purple coneflower, butterfly milkweed, oxeye sunflower, prairie blazing star, purple prairie clover, black-eyed susan, and rattlesnake master. These native plants will also attract many types of birds and butterflies!

Spiderwort

Prairie Blazing Star

Royal Catchfly

Black-Eyed Susans

Take Home Project — Everyone Has Waterfront Property

You live on waterfront property! While you may not live directly on a stream, the stormwater that leaves your property eventually ends up in one of Ankeny's streams or ponds. Stormwater that flows down your driveway heads to the nearest storm drain. Where does the water in that storm drain go? It goes straight into a stream or pond, without any treatment.

Your challenge is to keep as much stormwater on your property as possible. Divert your gutters onto grassy or landscaped areas and off impervious or hard surfaces.

Be careful of when, where, and how much chemicals you add to your lawn or driveway. Try not to let grass clipping go into the streets and gutters. Keep litter out of the storm drains. If we all do a little, we can keep Ankeny beautiful!

Welcome to Summerbrook Park!

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city of Ankeny — bringing it all together
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city of Ankeny
bringing it all together

Summerbrook Park is a Stormwater Conservation Area

Welcome to Summerbrook Park!

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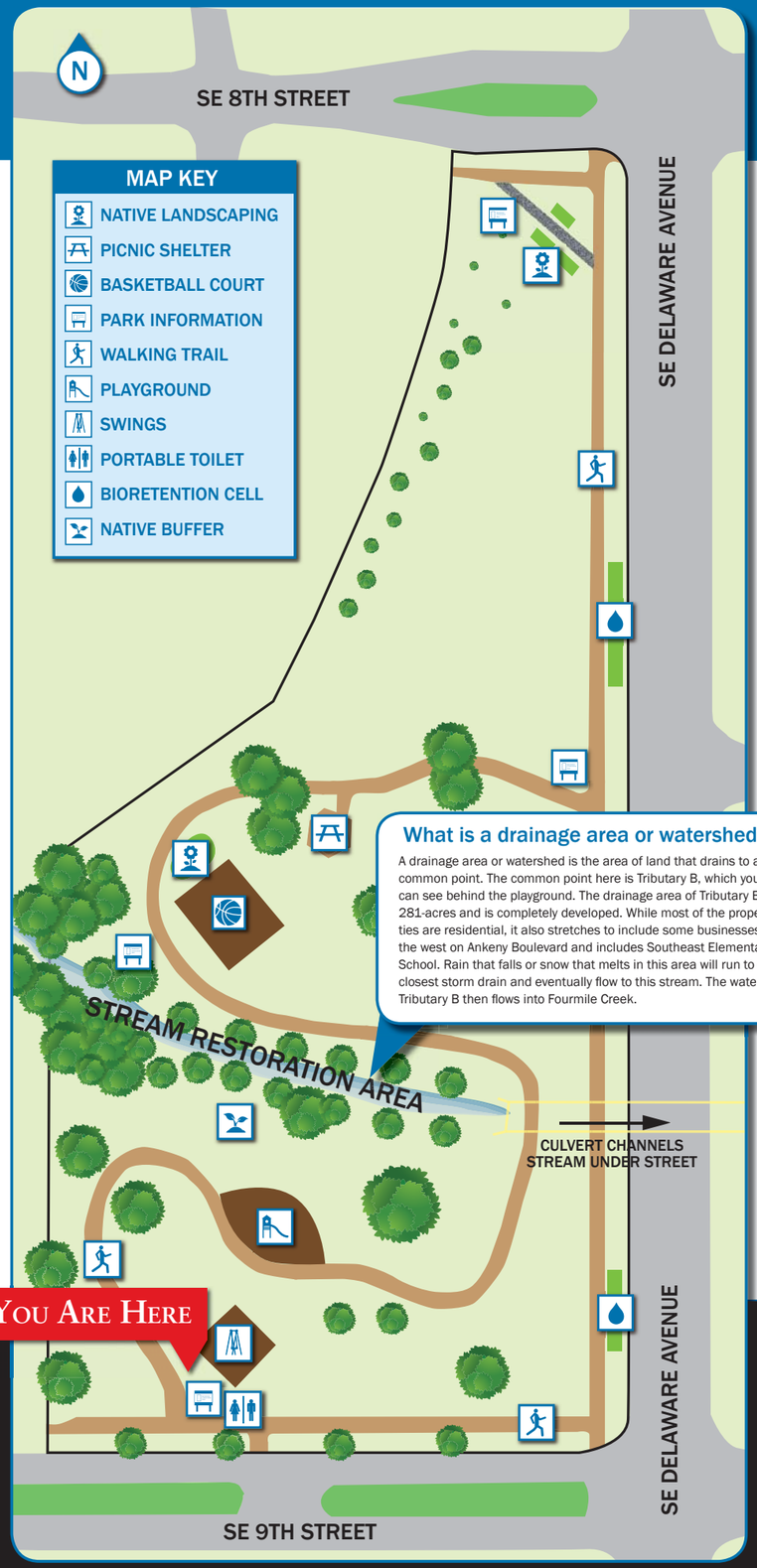
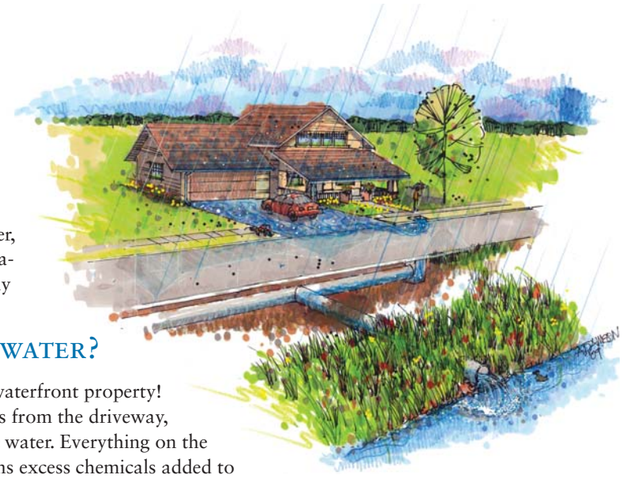
Learn More

Throughout the park, additional educational signs will illustrate the different stormwater conservation initiatives that were installed in 2011. The features include porous asphalt, native landscaping, bioretention cells and stream restoration. The purpose is to educate those that live, work and play in the area and foster a spirit of stewardship towards the land and water.

The signs also include ways to bring home these conservation ideas and how to make changes to enhance the water quantity and water quality of the local watershed.



What Is Stormwater?



Stormwater is the water that runs off impervious surfaces from rain, snow melt, and surface drainage. Impervious surfaces are hard surfaces where water is unable to soak or infiltrate into the ground. Impervious surfaces include paved streets, driveways, parking lots, roof tops, and other hard surfaces. This water drains overland collecting sediment, contaminants, litter, nutrients, pet waste, and other pollutants. The stormwater then discharges into the creeks and ponds in Ankeny untreated.

Why Do We Care About Stormwater?

We care about stormwater because everyone lives on waterfront property! Look at the image to the right; see how the water flows from the driveway, onto the street, into the storm drain, and right into the water. Everything on the driveway or road can end up in the stream which means excess chemicals added to your yard, oil and grease from your car, grass clippings and leaves left on the street can all end up in our streams and ponds.

What Can We Do With Stormwater?

The more rain we can get to infiltrate into the ground, the better our water quality and water quantity in our water bodies.

One easy and inexpensive way to reduce runoff is to capture the rainwater with a rain barrel and reuse it for watering and irrigation purposes. Rain barrels can be found at most home improvement stores or garden centers and come in many sizes and configurations. A typical urban lot receives more than 200,000 gallons of rainwater each year; that's enough to fill 4,000 rain barrels!

Did You Know?

American households use about 146,000 gallons of water per year and of this amount, 42 percent is used indoors (mostly for flushing, bathing and washing clothes) and the remaining 58 percent is used outdoors.

Downspout Disconnect

Take Home Project

There are lots of ways to reduce your hydrologic footprint, which is the amount of water that leaves your property when it rains. Wait until it rains and watch and see where the water runs off your property. Are your downspouts directed toward your driveway? Your challenge is to decrease the amount of water that leaves your yard.

Point your downspout off impervious surfaces and onto grassy or landscaped areas. Infiltrate more water into the ground and improve your lawn through soil quality restoration or by adding a rain garden.

For More Information on Ankeny's many City Parks and Regional Trails, go to www.ankenyiowa.gov

Funding Sources

Fourmile Creek Watershed
Iowa Department of Agriculture and Land Stewardship
DNR
city of Ankeny bringing it all together
Metro Waste Authority Your Partner in Environmental Solutions
Polk Soil & Water Conservation District
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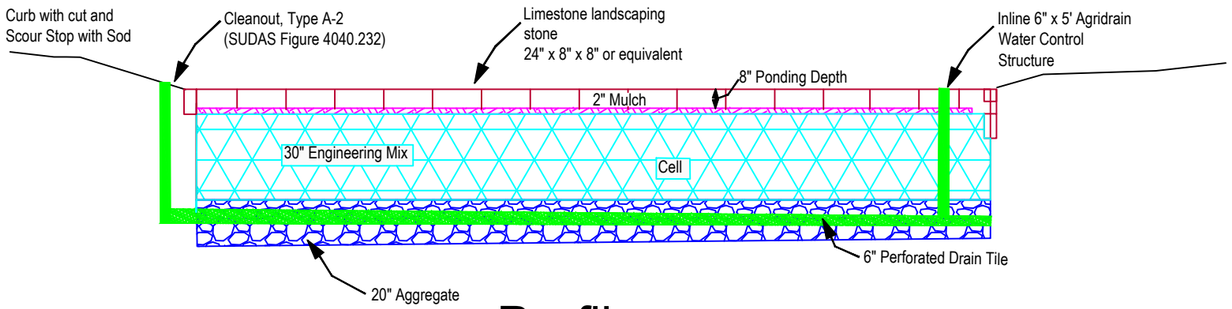
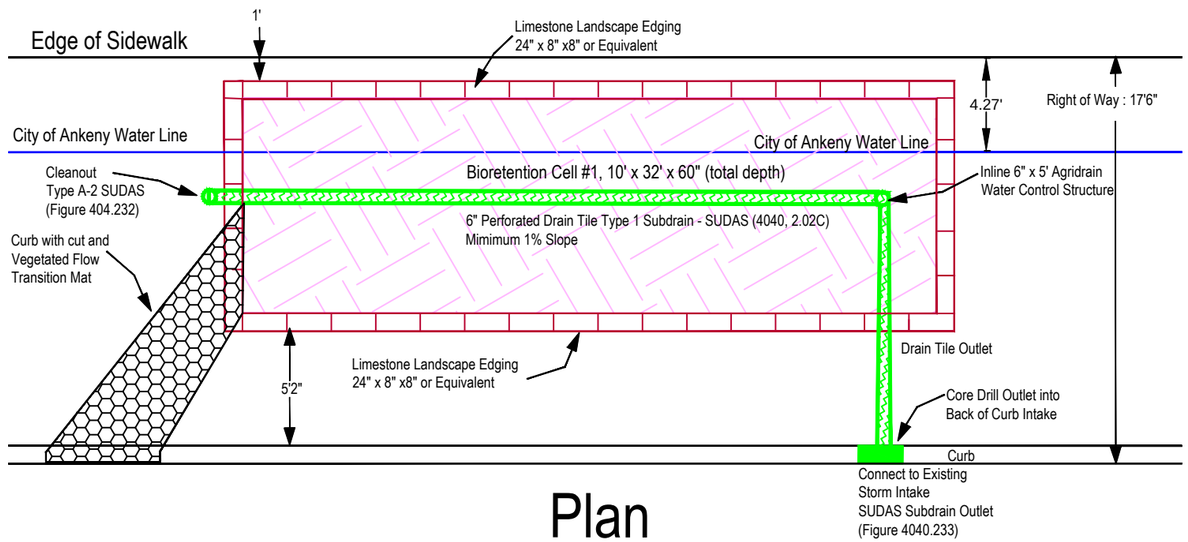
APPENDIX D
DIAGRAMS OF BIORETENTION CELLS

Bioretention Cell #3

NOTES :
- Each cell should drop 8" from previous cell.
- Mulch : 2" good quality coarse shredded hardwood
- Engineered Mix : 50% sand, 50% compost
- Aggregate: 1-2" Diameter Open-graded, clean, durable aggregate
- Subdrain : 6" perforated PVC pipe (AASHTO M252), SUDAS 4040, 2.02C $\frac{3}{8}$" Perforations, spaced 6" on center, minimum 4-holes per row
- Limestone landscaping stone approximately 24" x 8" x 8" or equivalent.

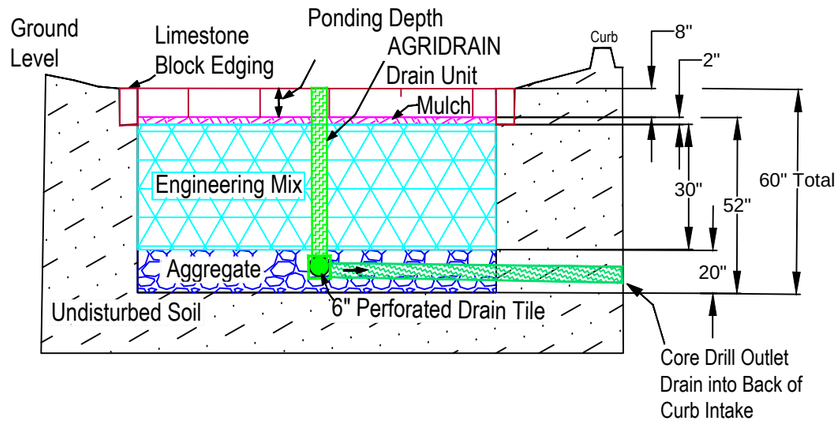


Profile

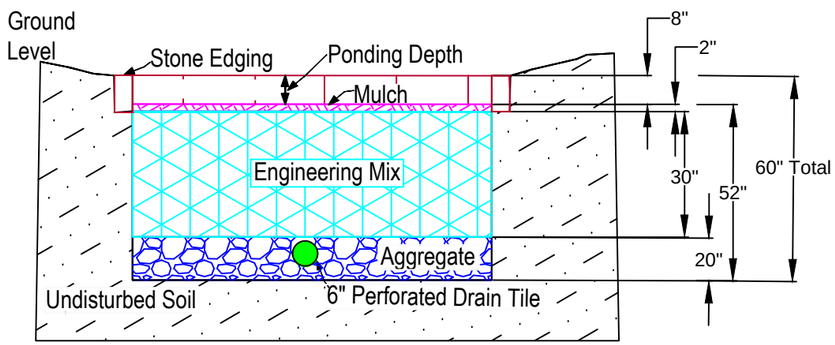


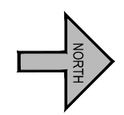
Plan

North End Profile with Agridrain



South End Profile with Subdrain





NO SCALE

ANOTHER CADD PRODUCT BY THE DIVISION OF ENGINEERING

city of Ankeny
bringing it all together

BIORETENTION CELL #3 FOR SUMMERBROOK PARK
CITY OF ANKENY, IA.

SHEET
02

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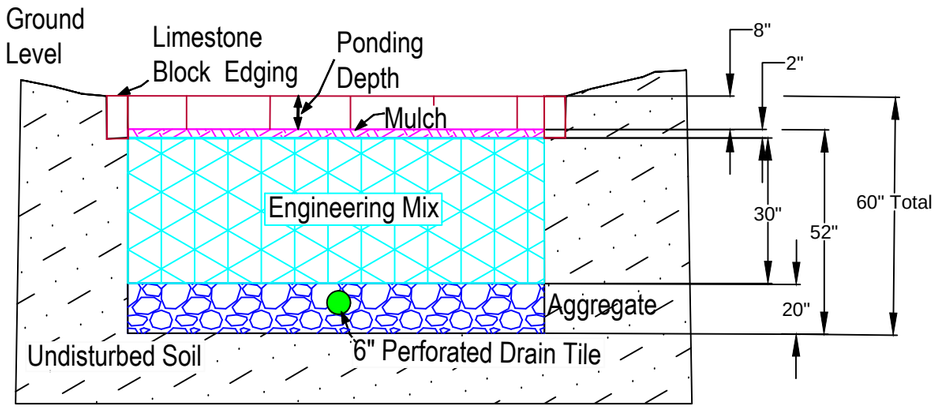
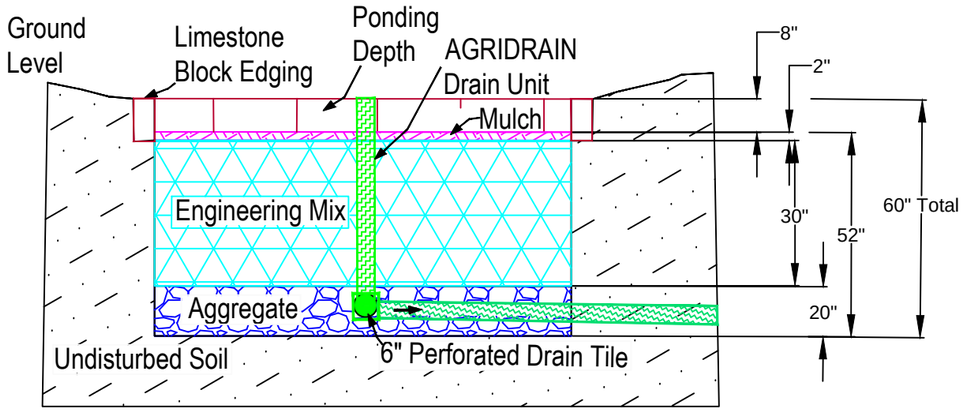
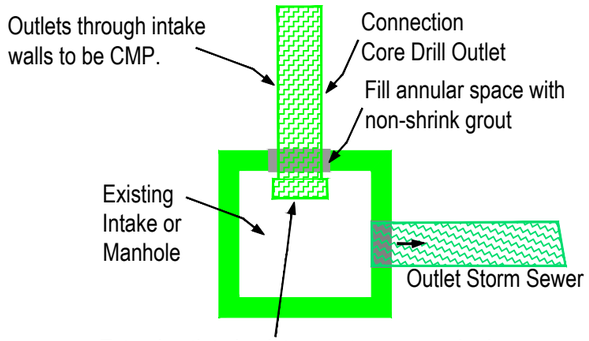
Bioretention Cells # 1 & #2 Details

North End Profile with Subdrain



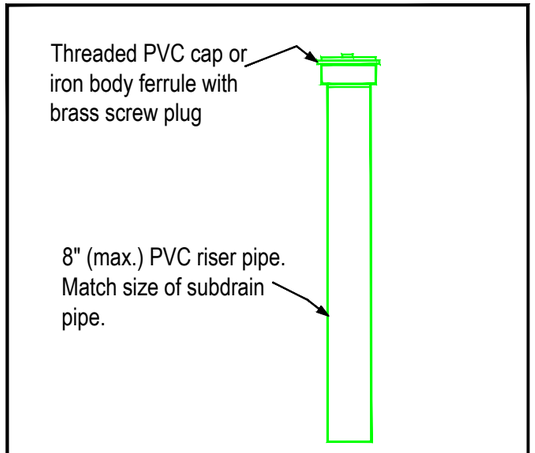
South End Profile with Agridrain





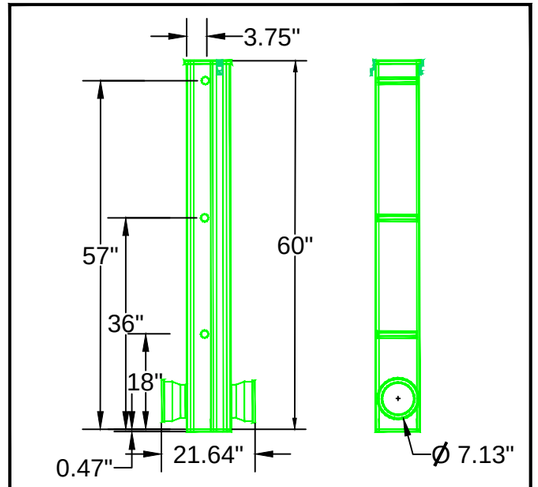
Subdrain Outlet Detail

SUDAS Figure 4040.233



Type A-2 Cleanout

(Non-traffic areas only)
SUDAS Figure 4040.232



Agridrain Detail

INLINE 6" X 5' WCS
Drawn with 1002-66 Coupler

ANOTHER CADD PRODUCT BY THE DIVISION OF ENGINEERING

city of Ankeny
bringing it all together

BIORETENTION CELL DETAILS FOR SUMMERBROOK PARK
DETAILS -- CITY OF ANKENY, IA.

SHEET
03

S:\PublicWorks\Engineering\Division\2009\Amy's Stuff\2 cell Bio Cell Details.dwg, 8/27/2010 1:08:34 PM

Bioretention Cells # 1 & #2

NOTES :
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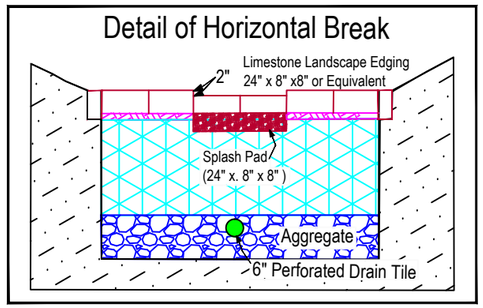
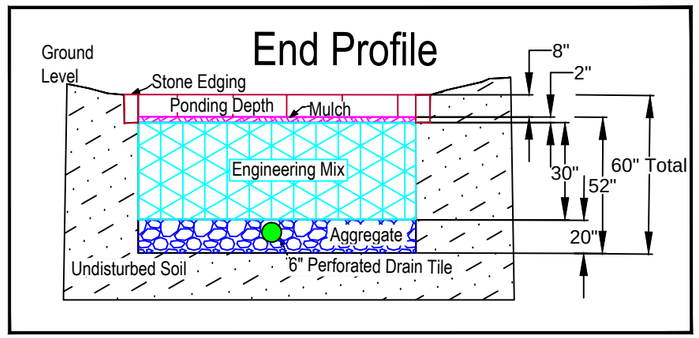
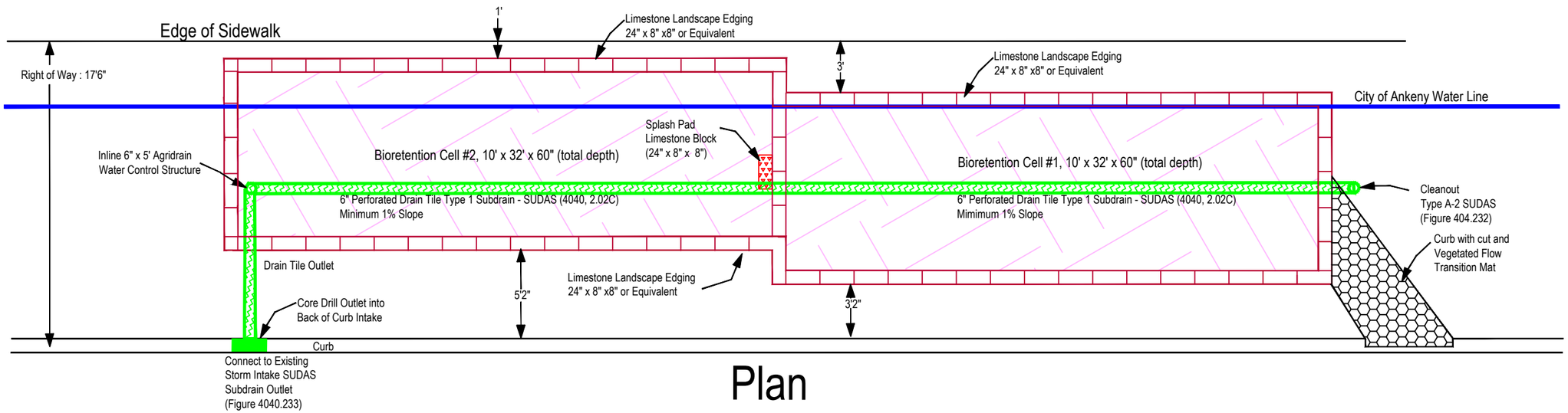
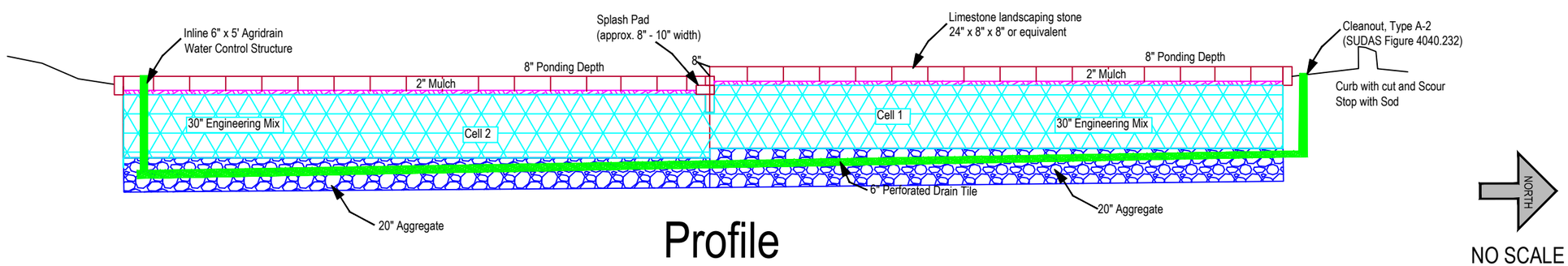
- Engineered Mix : 50% sand, 50% compost
- Aggregate: 1-2" Diameter Open-graded, clean, durable aggregate
- Subdrain : 6" perforated PVC pipe (AASHTO M252), SUDAS 4040, 2.02C $\frac{3}{8}$" Perforations, spaced 6" on center, minimum 4-holes per row
- Limestone landscaping stone approximately 24" x 8" x 8" or equivalent.









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APPENDIX E
MONITORING LOCATION MAP

MONITORING MAP