

# STORMWATER WETLANDS

## Stormwater Quality and Quantity Management



### WHAT ARE STORMWATER WETLANDS?

A stormwater wetland is a man made management practice that provides a natural way to treat and remove pollutants from stormwater runoff before it enters a stream, river, or lake. As stormwater is captured in the wetland, pollutant removal is achieved through various mechanisms. Vegetation aids in this process helping to slow, settle and uptake nutrients through biochemical reactions.

### WHY INSTALL STORMWATER WETLANDS?

Urbanized landscapes generate large quantities of stormwater runoff during rain storms. As stormwater flows off buildings and homes, into streets, down storm drains, and into local water bodies, it picks up pollutants that negatively affect water quality. Stormwater wetlands provide an opportunity to manage the quantity and quality of stormwater runoff from a large area of urban development. Without the use of stormwater wetlands or other stormwater management practices, polluted water would flow directly into water bodies.





# STORMWATER WETLAND COMPONENTS

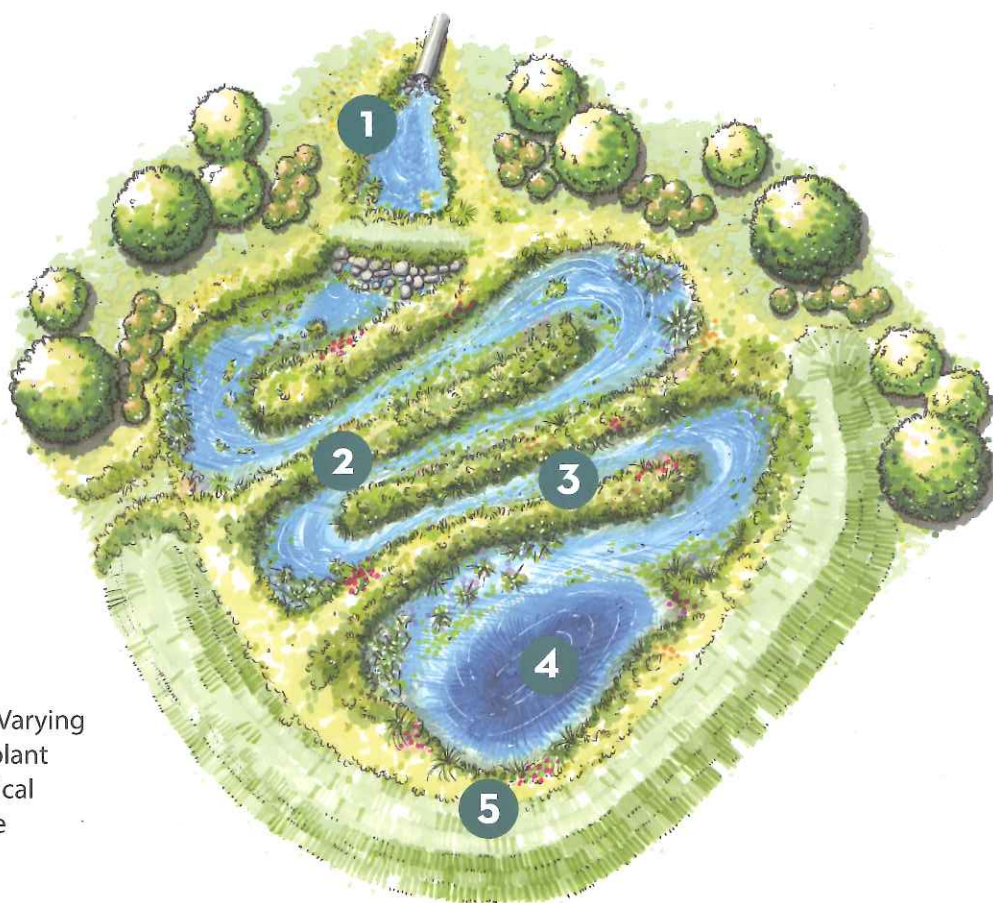
**1 Forebay:** Eroded soil is captured from incoming runoff before entering the wetland. Over time, buildup of eroded soils can be removed from the forebay allowing for easier maintenance. This prevents damage to the wetland and plants and increases overall longevity of the wetland.

**2 Microtopography:** A series of small berms and depressions designed to increase the distance water has to travel. This "stormwater maze" forces water to weave slowly through the wetland promoting pollutant removal.

**3 Areas of Shallow Water:** Varying depths of water promote plant growth allowing for biological uptake which helps remove pollutants.

**4 Pools:** Deep pools reduce the suspension of sediment, reduce thermal pollution, and increase habitat.

**5 Outlet:** A primary function of a stormwater wetland is to help slow down stormwater. Aligning with this goal, the outlet of the wetland is intentionally designed to release water slowly to improve downstream environmental conditions.





# STORMWATER WETLAND SITE SELECTION

Stormwater wetlands are able to treat flow at the end of a drainage swale or stormwater pipe. Many urban areas have limited space to install retrofit practices. Stormwater wetlands often can be located in parks or open space areas at the outlet of stormwater pipes or drainage swales. Unlike other options, they can be used to treat runoff from large drainage areas with a single end of pipe practice. That creates efficiencies by treating a larger area with only one stormwater practice to inspect and maintain.

A public area allows the community to control the installation, maintenance and use of the wetland and buffer area. They are perfect for greenways and park space and provide additional community benefits such as recreation, habitat and education.

## STORMWATER PIPE AND SURFACE DRAINAGE MAP



These maps are a good source of reference to determine potential wetland sites.

- Look for pipe outlets and drainage swales that flow to open space or public areas near a stream.
- Check the sites to be sure there is enough elevation change to bring the stormdrain water to the surface and into the wetland and to a wetland outlet.
- Avoid existing wetlands and sensitive areas.

### ● UNSUITABLE WETLAND SITE

- too close to stream
- not enough space

### ▲ POTENTIAL WETLAND SITE WITH PIPE REDIRECT

- utilize nearby area
- move pipe outlet

### ★ SUITABLE WETLAND SITE

- adequate space
- elevation considerations

### → STORMDRAIN PIPES AND OUTLETS



## DRAINAGE AREA AND WETLAND SIZE GUIDANCE

10 acres minimum drainage area

3-5% of drainage area needed to treat water quality volume

6-12% of drainage area needed to manage large flood events

Once a potential wetland site is identified:

- Determine the drainage area to check if wetland site is adequate.
- An engineer can further study the site feasibility.

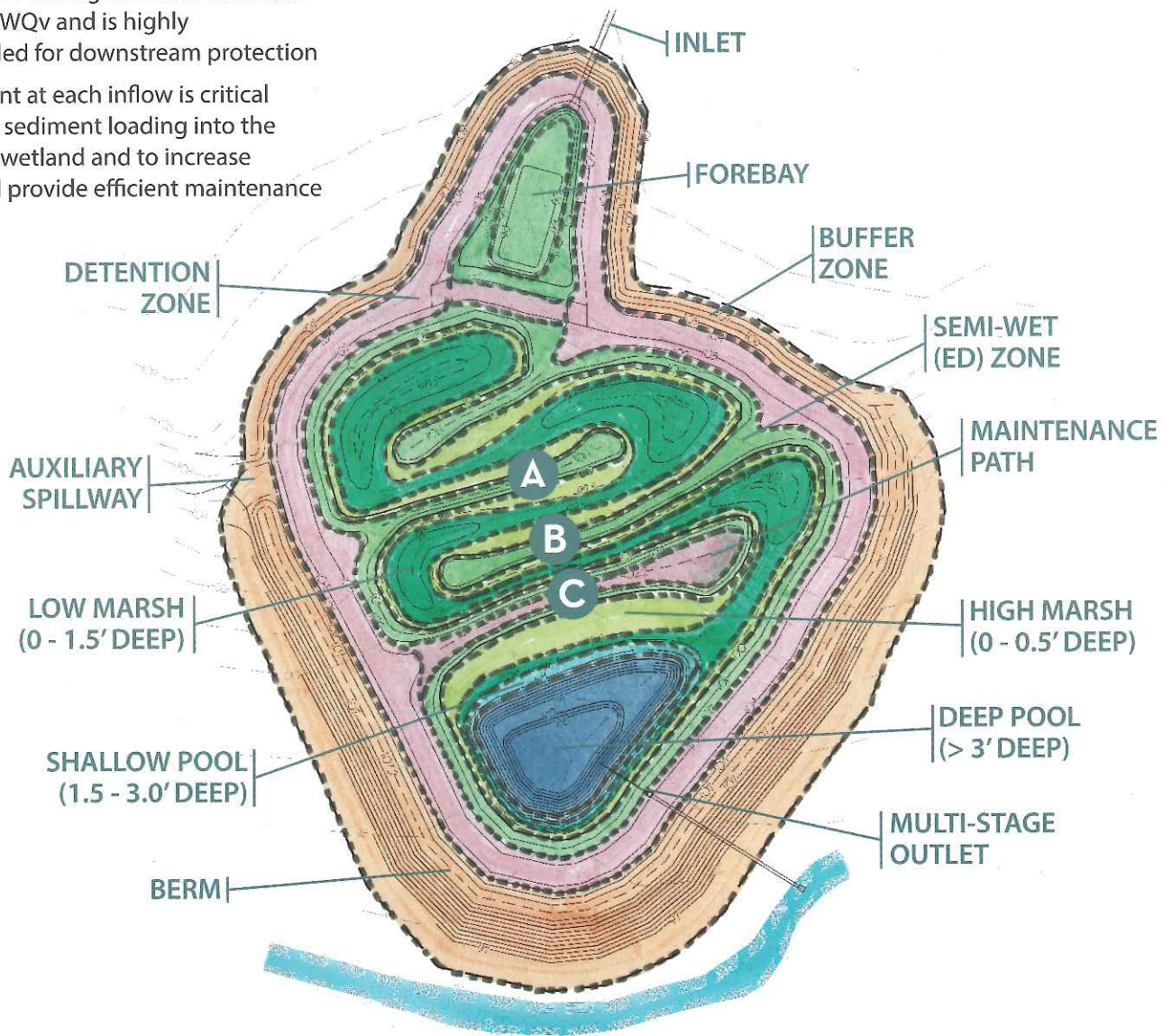


# DESIGN ELEMENTS

Stormwater wetlands can be designed to address both stormwater quality and quantity using the unified sizing criteria. Refer to the Iowa Stormwater Management Manual for complete design guidelines and calculation worksheets.

## DESIGN HIGHLIGHTS

- Be able to pass or manage all the storm events safely through the wetland
- Minimum treatment is for water quality volume storage in the permanent pool (1.25" 24 hour rain)
- Channel protection volume (1 year storm) can usually be managed within the same footprint as WQv and is highly recommended for downstream protection
- Pre-treatment at each inflow is critical to minimize sediment loading into the stormwater wetland and to increase lifespan and provide efficient maintenance





## WETLANDS IN ACTION



### Removes Pollutants through Settling

Eroded soil is a major pollutant prevalent in Iowa waters. When stormwater is slowed down in the stormwater wetland, eroded soil settles out and improves water clarity.



### Slows Down Stormwater

Instead of rapidly flowing directly into a water resource, the stormwater from a contributing water course now slowly flows through the wetland providing temporary water storage and other benefits.



### Removes Pollutants through Biological Uptake

Plants present in wetlands have special chemical and biological functions that can help remove pollutants through biological uptake. These biological processes remove nutrients such as phosphorus and nitrates, and common pollutants in Iowa waterways.



### Supports Wildlife and Habitat

Wetlands support a wide variety of plant and animal life. Typical wetland species have sturdy stems, leaves, and flowers that provide a great habitat for birds, animals, and invertebrates.

## FEATURED STORMWATER WETLANDS

Ankeny is a leader in utilizing wetlands across their city to manage and treat stormwater runoff. Several wetlands were installed in the Prairie Trail Development as part of a stormwater treatment train. The wetlands slow down the runoff and remove pollutants before moving to the next stormwater structure. A wetland constructed adjacent to Fourmile Creek and north of 36th Street was built to address sediment and nutrients in the runoff from 55 acres which would have flowed untreated directly into the creek. These wetlands also provide habitat for a variety of wildlife species as well as educational opportunities for the public.



Prairie Trail Development



# STORMWATER WETLANDS OF IOWA



**1** Spencer - Partnership with Walmart

**2** Webster City - Riverside Park

**3** Ankeny - 36th St. and Fourmile Creek

**4** Cedar Falls - University of Northern Iowa

**5** Des Moines - Northeast Corner of Easter Lake

**6** Storm Lake - Abner Bell Wetland