



## IMPACTS OF STORMWATER

During storms, impervious surfaces such as roadways, parking lots and compacted soils cause accumulated pollutants to flow into storm drains without treatment. The contaminated water then makes its way into streams and rivers.

Rainwater should naturally soak into the soil to be filtered, but impervious areas prevent that from happening. This causes an increase in the volume and rate of polluted stormwater runoff into local waterbodies. As communities grow, they often experience even more stormwater runoff problems.



Without proper stormwater management, developed areas negatively impact their surroundings. There is increased water runoff which damages stream channels, pollutes water resources, and causes flooding.

*Stormwater from roads and buildings can impact private property. Unlike common public infrastructure such as roads, sewers, or electricity, stormwater is often left for citizens to repair when damage occurs on private property.*

### UPDATED DESIGN STRATEGIES

Better site design is the first step to improved communities. Urban areas should be designed to:

- preserve natural drainage in open spaces
- reduce flow of additional stormwater
- reduce pollutants
- reduce flooding
- reduce impervious surfaces

This approach is used with management of both small and large storm events to:

- improve water **quality**
- reduce water **quantity**

### WATER QUALITY PROTECTION

#### Small Storms

These are methods that target the small rainfall events. They provide treatment for the dirtiest portion of the runoff. The methods will help water soak into the ground, limit runoff in small rains, and reduce runoff that is causing erosion and damage in streams.



### FLOOD PROTECTION

#### Large Storms

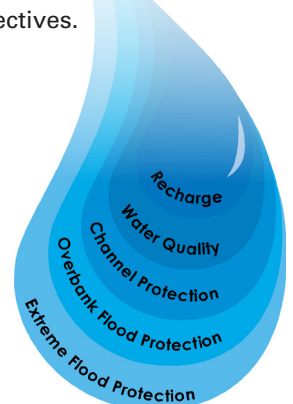
These are methods to manage the large and infrequent storms that cause infrastructure damage and the catastrophic floods that threaten public safety.



### UNIFIED SIZING CRITERIA

Unified Sizing Criteria is a comprehensive approach to design stormwater management systems.

It uses measurement standards to meet flooding, health, safety, and water quality goals. These criteria are used to design best management practices that meet desired treatment objectives.



# OBJECTIVES OF UNIFIED SIZING CRITERIA

The Unified Sizing Criteria is used to manage stormwater with engineering techniques that protect our streams, rivers, and lakes. This approach mimics how Iowa's original native prairie landscape and soils were able to soak in rainfall.



This pond is part of a series of natural treatment areas for stormwater. It was designed using the unified sizing criteria and it creates an open, park-like setting for residents to enjoy.



Permeable pavers (top) and bioretention cells (bottom) also soak in rainfall and manage stormwater where it falls instead of shedding polluted water.

## SMALL STORM *Criteria for Water Quality:*

### RECHARGE VOLUME (Rev)

- Absorbs rainfall and replenishes groundwater
- Reduces surface runoff and improves stream low-flow
- Infiltrates or reuses up to 1.0" of rainfall

### WATER QUALITY VOLUME (WQv)

- Captures runoff from the most common storm events
- Provides water quality treatment and reduced pollutant loads
- This amount of runoff results from a 1.25" rainfall (includes 90% of all storms in Iowa)

### CHANNEL PROTECTION VOLUME (CPv)

- Stabilizes streams by reducing flow rates and stream erosion
- Slowly releases the amount of rainwater from a 1-year storm over 24 hours (approximately 2.7" rain)

## LARGE STORM *Criteria for Water Quantity:*

### OVERBANK FLOOD PROTECTION (Qp)

- Reduces local flash flooding from overloaded storm drains
- Reduces streams from overflowing their banks within communities
- Manages approximately 3.0" to 4.5" rainfall from a 2-year to 10-year storm

### EXTREME FLOOD PROTECTION (Qf)

- Prevents flood damage to downstream properties and infrastructure
- Prevents increases in high water elevation during a flood
- Manages up to and beyond a 100-year storm (approximately 8.0" rain)

For more information, refer to:

Iowa Stormwater Management Manual (ISWMM) – a statewide stormwater resource that provides design information on the Unified Sizing Criteria as well as stormwater best management practices.

Visit this site to view the ISWMM: [www.iowadnr.gov/Environmental-Protection/Water-Quality/NPDES-Storm-Water/Storm-Water-Manual](http://www.iowadnr.gov/Environmental-Protection/Water-Quality/NPDES-Storm-Water/Storm-Water-Manual)

