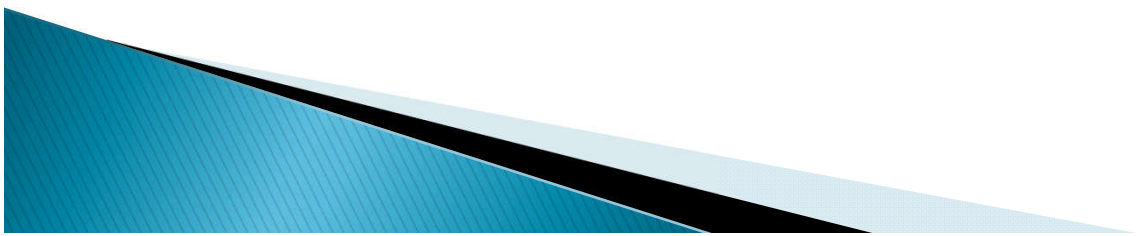
When It Rains, It Drains

An Overview of
Our Community's
Post-Construction
Stormwater Management
Program

Let's Talk About Post-Construction Management!

- Introduction
- Minimum Site Performance Standards
- Maintenance of Controls
- Tracking Controls
- Inspection and Enforcement
- Questions



Introduction

- Past Regulations:

Moving runoff quickly away

- Current Regulations:

Improving water quality via infiltration

Clean Water Act

- The CWA requires select municipalities (Phase I and Phase II Communities) to implement treatment practices to manage runoff in a manner to protect receiving waters.
- Requirements are enforced through the National Pollution Discharge Elimination System (NPDES) permit for each Municipal Separate Storm Sewer System (MS4), issued by the EPA.

Nebraska Phase II MS4 Permit Holders include:

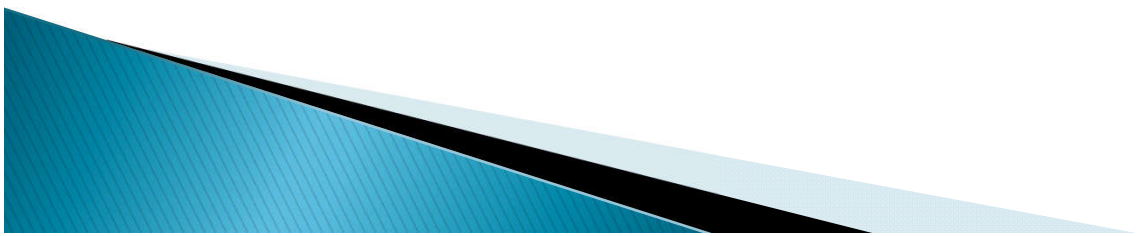
- Kearney
- Grand Island
- North Platte
- Hastings
- Scottsbluff
- Lexington
- Norfolk
- Beatrice
- Fremont
- Columbus
- South Sioux City
- Douglas County
- Gering

❖ A "Phase II MS4 Permit Holder" is any municipality/urban cluster with a population between 10,000 and 100,000

Nebraska Department of Environmental Quality

Post-Construction Stormwater Management (PCSWM)

- One of Six Minimum Control Measures in SWMP
  1. Public Education and Outreach
  2. Public Involvement and Participation
  3. Illicit Discharge Detection and Elimination
  4. Construction Stormwater Management
  5. Post-Construction Stormwater Management
  6. Good Housekeeping/Pollution Prevention



Expected Benefits of Our Program

- Enhanced opportunities for recreation
- Reduced flood damage
- Drinking water benefits
- Reduced illness
- Enhanced aesthetic value
- Minimized Stormwater Pollution

MS4 Permit Requirements:

- Control and Treat Stormwater Runoff
  [Stormwater Treatment Facilities (STFs)]
- Submit a Plan for Review
  (City Code, Chapter 9-1606; PCSWP Section 3)
- Enforce Inspections of Facilities
- Enforce Noncompliance
  (City Code, Chapter 9-1643)
- Re-evaluate the Program
  ('Living Document')

Applicability

- Within the ETJ
- Land Disturbance >1 AC
- New and Redevelopment

IMPORTANT

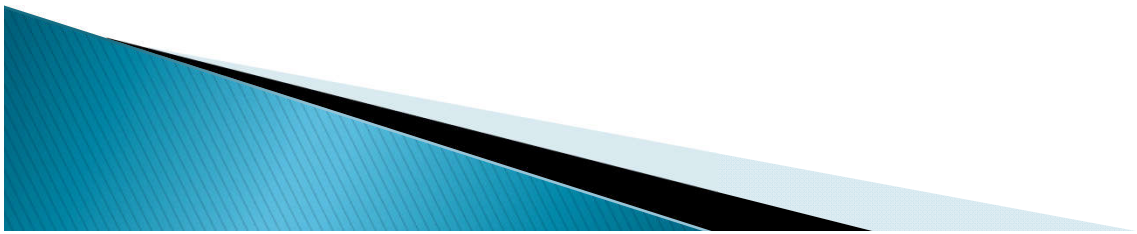
- These provisions apply to all portions of any common plan of development or sale which would cause the DISTURBANCE OF AT LEAST ONE ACRE OF SOIL, even though multiple, separate and distinct land development activities may take place at different times on different schedules.

Minimum Site Performance Standards

- New development and Redevelopment must satisfy minimum site performance standards that address water quality.

- Methodology:
  - **WQCV** (Water Quality Control Volume)
  - Q_{WQ} (Water Quality Volume Discharge Rate)

  Based on rainfall data – runoff volume or rate is then calculated for the treatment area.



New Development:

Areas which are being platted for development or have been platted but not built and are within the community's "MS4 Boundary" (ETJ).

Minimum Standard for new development is the 80th percentile rainfall event (in Red).

Redevelopment:

Areas which have been platted and built on within the community's MS4 boundary.

Minimum standard for redevelopment is the 70th percentile rainfall event (in Red).

Applicable Region	Rainfall, P	
	80th Percentile Event (New Development)	70th Percentile Event (Redevelopment)
A (West)	0.61"	0.44"
B (Central)	0.72"	0.53"
C (East)	0.83"	0.62"

Stormwater Treatment Calculations

CALCULATIONS

- ☐ Water Quality Volume (WQCV) or Water Quality Volume Discharge Rate (Q_{WQ}) for each STF (To be included with a site design or subdivision drainage study)
- ☐ Drainage Study

Water Quality Control Volume (WQCV)

For **STFs** that function based on a **volume** held for a set amount of time (i.e. rain gardens, bioretention basins, ponds)

Water Quality Volume Discharge Rate (Qwq)

For **STFs** that function based on **flow rate** (i.e. swales, filter strips, manufactured systems etc.…)

WQCV Calculations

WQCV= P x (0.05+0.009 x %imp) x A x 1/12 x 43,560

Where,

P = rainfall depth (new 0.72" ; re 0.53")
A = treatment drainage area in acres
%imp = maximum percent imperviousness (expressed as a whole number not as a decimal) for proposed zoning types (use maximum impervious %)
*(0.05 and 0.009 are constant variables)

Water Quality Volume
Discharge Rate Calculations

Q_{WQ} is the **peak runoff** from the design water quality rainfall event. The calculation is based on:

- the 80th percentile rain event depth by region (West, Central, East)
- a 24 hour duration storm event
- a time of concentration of 5 minutes

The area used is the **impervious area** only within the treatment drainage area.

Use tables or model to determine **Q_{WQ}**

STF Suitability

STF	Residential	Commercial	Block	Neighborhood
Bioretention Area		x	x	x
Bioswale/Grassed Swale	x	x	x	x
Dry Retention/Retention		x	x	x
Filter Strip	x	x	x	x
Infiltration Trench	x	x	x	
Rain Garden	x	x	x	
Underground Storage		x		
Wet Detention		x	x	x
Roof Drain Filters		x		

*The City of Kearney may be amenable to other forms of STF's if properly presented

Potential Off-Site Mitigation

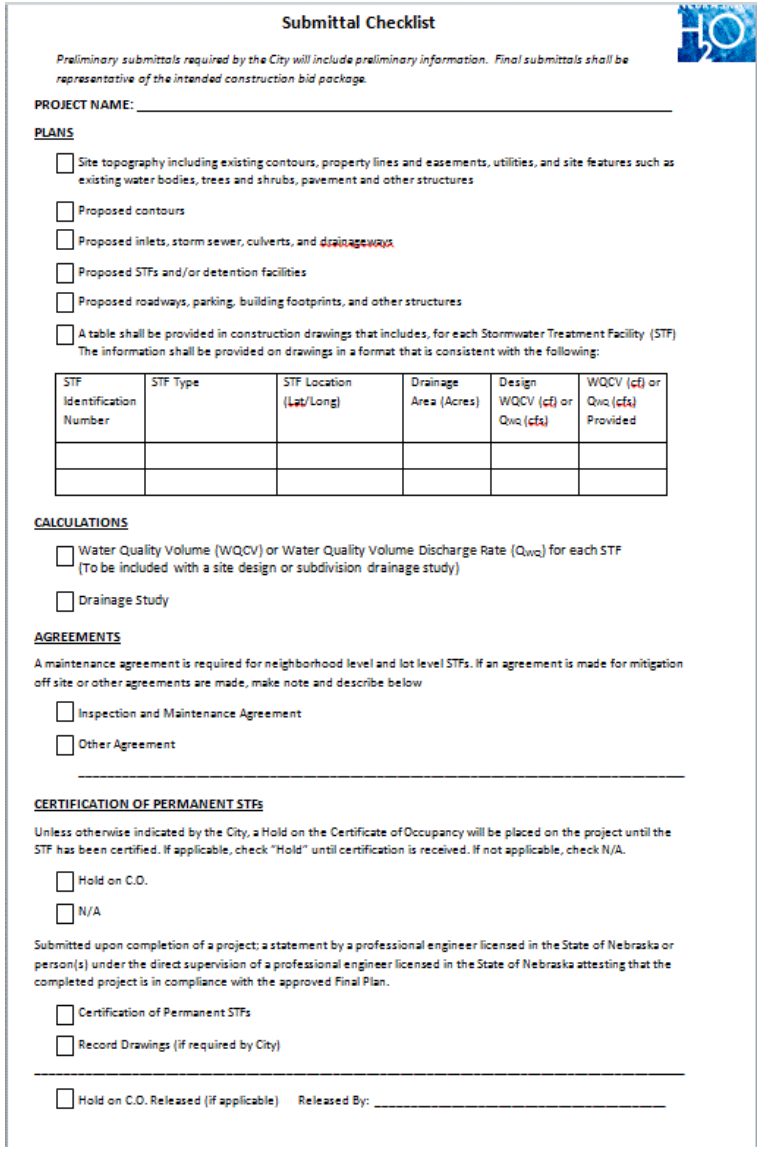
- Property-to-Property exchange of STF responsibilities (same owner)
- Public or Private Redevelopment
- Redevelopment Scenarios (limited existing space)
- Same River Basin (Wood River or Platte River)

Submittals needed for:

- Site Plan Applications
- Subdivision Applications
- Building Applications
- Right-of-Way Applications from the City

Submittal Checklist

- Plans & Tracking
- Stormwater Treatment Calculations
- Certification of Stormwater Treatment Facilities



Submittal Checklist

Preliminary submittals required by the City will include preliminary information. Final submittals shall be representative of the intended construction bid package.

PROJECT NAME: _____

PLANS

- ☐ Site topography including existing contours, property lines and easements, utilities, and site features such as existing water bodies, trees and shrubs, pavement and other structures
- ☐ Proposed contours
- ☐ Proposed inlets, storm sewer, culverts, and drainageways
- ☐ Proposed STFs and/or detention facilities
- ☐ Proposed roadways, parking, building footprints, and other structures
- ☐ A table shall be provided in construction drawings that includes, for each Stormwater Treatment Facility (STF) The information shall be provided on drawings in a format that is consistent with the following:

STF Identification Number	STF Type	STF Location (Lat/Long)	Drainage Area (Acres)	Design WQCV (cf) or Q_{WQ} (cfs)	WQCV (cf) or Q_{WQ} (cfs) Provided

CALCULATIONS

- ☐ Water Quality Volume (WQCV) or Water Quality Volume Discharge Rate (Q_{WQ}) for each STF (To be included with a site design or subdivision drainage study)
- ☐ Drainage Study

AGREEMENTS

A maintenance agreement is required for neighborhood level and lot level STFs. If an agreement is made for mitigation off site or other agreements are made, make note and describe below

- ☐ Inspection and Maintenance Agreement
- ☐ Other Agreement

_____

CERTIFICATION OF PERMANENT STFs

Unless otherwise indicated by the City, a Hold on the Certificate of Occupancy will be placed on the project until the STF has been certified. If applicable, check "Hold" until certification is received. If not applicable, check N/A.

- ☐ Hold on C.O.
- ☐ N/A

Submitted upon completion of a project; a statement by a professional engineer licensed in the State of Nebraska or person(s) under the direct supervision of a professional engineer licensed in the State of Nebraska attesting that the completed project is in compliance with the approved Final Plan.

- ☐ Certification of Permanent STFs
- ☐ Record Drawings (if required by City)

_____

☐ Hold on C.O. Released (if applicable) Released By: _____

Plans

Post-Construction Stormwater Management Plan (PCSMP) Submittal Checklist

Preliminary submittals required by the City will include preliminary information. Final submittals shall be representative of the intended construction bid package.

PROJECT NAME: _____

PLANS

- ☐ Site topography including existing contours, property lines and easements, utilities, and site features such as existing water bodies, trees and shrubs, pavement and other structures
- ☐ Proposed contours
- ☐ Proposed inlets, storm sewer, culverts, and drainageways
- ☐ Proposed STFs and/or detention facilities
- ☐ Proposed roadways, parking, building footprints, and other structures
- ☐ A table shall be provided in construction drawings that includes, for each Stormwater Treatment Facility (STF) The information shall be provided on drawings in a format that is consistent with the following:

Tracking Controls

City of Kearney will maintain an inventory of Stormwater Treatment Facilities completed on both public and private sector sites located within the permit area.

STF Identification Number	STF Type	STF Location (Lat/Long)	Drainage Area (Acres)	Design WQCV (cf) or Q_{WQ} (cfs)	WQCV (cf) or Q_{WQ} (cfs) Provided

(located within the PCSMP Checklist)

What Does Our Permit Require?

- Implement a Post-Construction Stormwater Management Plan
- Track/Inspect/Maintain STFs
- Report on our progress
- Adopt stormwater management ordinance
- Ensure proper operation and maintenance of post-construction controls

Maintenance Agreement

- The obligation to maintain the STF's shall have been memorialized on a subdivision plat, annexation plat, development agreement, subdivision agreement or other form acceptable to the City and recorded by the City with the project records.

- "Maintenance Agreement" forms will be made available with the program, outlining the legal agreement the City of Kearney has with the original owner of the STF's in discussion.

Inspections

- Prior to construction of STF's there will be a required inspection* of the site for validation of proper placement of planned STF's.

- During the course of constructing the STF an inspection* will be needed for verification of proper installation.

- Self-inspections, performed by the property owner, are submitted by owner of project within 90-days following Municipal Approval
  - Frequency of self-inspections following C/O shall be no longer than 3 years.

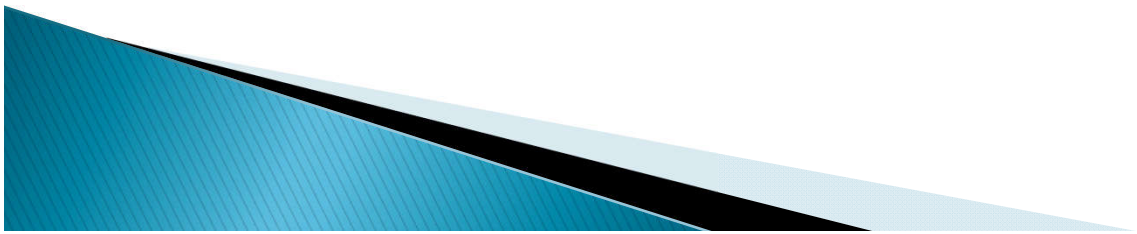
- Municipal/Capital Improvement projects, inspections will be completed by the City for each completed project within 90-days following municipal of project.

*These inspections will be completed by someone of the Director of Public Work's choosing or a civil engineer in the State of Nebraska.

Inspection Importance

- Importance of proper installation dependent on purpose.
    - Volume VS. Flow Rate
        - Infiltration most important
- Follow design instructions carefully- inspect carefully.
- Specific material and specific compactions.

*To aid in inspection, STFs could be incorporated into SWPPP, use of BMPs



Enforcement

City of Kearney Municipal Code Chapter 9, Article 1643, Division V

A. Compliance Directive

B. Notice of Violation.

C. Appeal of Notice of Violation

D. Enforcement Measures after Appeal

E. Stop Work Order

F. Cost of Abatement of the Violation

G. Civil Penalties

H. Criminal Penalties; Enforcement Costs

I. Injunctive Relief

J. Violations Deemed a Public Nuisance

K. Remedies Not Exclusive

References:

- City of Kearney, *"City of Kearney City Code-Chapter 9, Article 16: Construction and Post-Construction Stormwater Code"* http://citycode.kearneygov.org:8080/citycode/0/doc/1202638/Page1.aspx

- City of Omaha, *"Omaha Regional Stormwater Design Manual- Chapter 8: Stormwater Best Management Practices"* http://omahastormwater.org/orsdm/

- City of Lincoln, *"Drainage Criteria Manual- Chapter 8: Stormwater Best Management Practices"* http://lincoln.ne.gov/city/pworks/watershed/dcm/

- NDOR, *"Drainage and Erosion Control Manual- Chapter 3: Stormwater Treatment within MS4 Communities"* http://dot.nebraska.gov/media/3920/chapter-3-stormwater-treatement.pdf

- Urban Drainage and Flood Control District (UDFCD), *"Urban Storm Drainage Criteria Manual, Volume 3: Stormwater Quality"* http://udfcd.org/volume-three

*"Post-Construction Stormwater Management Program" Supplement will soon be online as a resource for design standards.

For More Information. . .

- Dan Lillis
- Stormwater Program Manager
  stormwater@kearneygov.org
  (308) 233-3273
  Public Works Department
  18 East 22nd Street
  P.O. Box 1180
  Kearney, NE 68848-1180
  FAX (308) 233-3209