Appendix B
Technical Memorandum – Existing Practices for Green Infrastructure and Stormwater Management, City of Omaha

TETRA TECH, INC.

TECHNICAL MEMORANDUM

Date:	October 19, 2012
To:	City of Omaha
From:	Carol Hufnagel, Dan Christian, Anne Thomas, Val Novaes: Tetra Tech
Subject:	Existing Practices for Green Infrastructure and Stormwater Management, City of Omaha
Contract:	EP-C-11-009
	US EPA Green Infrastructure Community Partners Project

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A. EXECUTIVE SUMMARY

The City of Omaha, Nebraska desires to more broadly implement stormwater practices and green infrastructure as part of other municipal projects. This project will aid the City in the development of processes and tools to improve consistency in decision making and reduce barriers for inclusion of these practices.

Project Goals and Objectives. The City of Omaha, NE is the recipient of technical assistance from US EPA for the application of green infrastructure. The focus of the effort will be on developing processes that aid in its implementation. Of particular focus will be the assessment of approaches that improve the ability of Omaha to include green infrastructure in municipal projects. There is no current standard in the City for municipal right of way projects as it relates to stormwater management, other than drainage for flooding frequency events. The City is attempting to include control of the water quality volume in CSO projects, but this has a relatively significant financial test which is difficult to overcome.

In the context of the current technical assistance project, the intent is to work within the existing ordinances and standards that have been adopted and/ or published by the City. The goal is to develop process elements that work with the existing language to better support the implementation of green infrastructure through clarifying decision points and valuing the benefits that result from green infrastructure implementation.

Processes. The incorporation of green infrastructure is a relatively new practice in stormwater management. As a result, the criteria by which stormwater systems are designed is in the process of shifting from primarily flood control to a stormwater quality and green infrastructure approach. This shift results in the need for various decision making methodologies to support the goals of more localized management of stormwater. Each project type has its own inherent process of decision making. These project types include public and private projects, new development and redevelopment, CSO- and non-CSO- related activities.

As a result of the City's MS4 requirements and the leadership of the City in responding to these requirements, use of best management practices (BMPs), including green infrastructure, has been incorporated into most private development and redevelopment projects. Municipal projects have less defined processes for stormwater. Principal design criteria relate to design storm flow control and sizing of sewers, with the exception of CSO area projects where control of the first ½" of runoff is identified as an objective, when financially feasible.

A review of various documents pertaining to stormwater management in Omaha was conducted in order to summarize the specific requirements. Some of these documents have been adopted and others are in draft form. The documents focus on requirements to control (i.e. treat) the water quality volume (first ½" of runoff) and matching predevelopment conditions for the 2-, 10- and 100-year flood frequency events. While the documents are relatively clear for private developments, applicability to municipal projects (e.g. right-of-way corridors) is not defined.

B. DOCUMENTS REVIEWED

The information contained herein is a summary of applicable ordinances, manuals, guidelines and policies related to stormwater management and green infrastructure. The documents were reviewed to identify requirements versus recommendations as they pertain to the application of green infrastructure. The requirements and recommendations and basis for exceptions are summarized below. Documents included in the review and summarized below are the following:

- Omaha Regional Stormwater Design Manual
- Omaha Regional Stormwater Design Manual, Chapter 8, Draft (June 2012)
- City of Omaha Post Construction Stormwater Management Planning Guidance
- City of Omaha Codes and Ordinances
- City of Omaha MS4 permit and related documents
- U.S. Mayors Climate Protection Agreement
- Omaha Green Solutions Site Suitability Assessment and BMP Selection Guidance
- City of Omaha Master Plan – Stormwater Element
- City of Omaha Master Plan – Transportation Element
- Omaha's Historic Boulevards Master Plan

Documents included in the review but were not found to be significant to stormwater standards include the following:

- Omaha Regional Stormwater Design Manual, Chapter 9, Draft (June 2012)
- Green Streets for Omaha (February 2007)
- City of Omaha Master Plan – Environment Element

The following are additional documents referenced by Omaha but do not represent policy or requirements and were not reviewed:

- Manual of Best Management Practices for Stormwater Quality http://www.marc.org/Environment/Water/bmps.htm
- Urban Storm Drainage Criteria Manual – Volume 3 http://www.udfcd.org/downloads/down_critmanual_volIII.htm

Table 1 and Table 2 provide an overview of the requirements as articulated in the current code, standards and references.

Table 1 lists these by reference source and Table 2 lists by project type.

Table 1: Requirements By Document Source

Document	Requirement
Omaha Regional Stormwater Design Manual (April 2006)	• Minor drainage system designed for runoff from the 10-year storm. • Major drainage system designed for runoff from the 100-year storm. • Storage facilities designed to maintain the peak rates from the 2-, 10- and 100-year storms. • NPDES NOI and SWPPP are required for land disturbance on sites of 1.0 acre and greater.
Omaha Regional Stormwater Design Manual, Chapter 8, Draft (June 2012)	• New development and significant redevelopment must 1. control the water quality volume 2. have no increase in the pre-project runoff rate for the 2-, 10-, and 100-year runoff rate
City of Omaha Post-Construction Stormwater Management Planning Guidance (November 2011)	• Develop a PCSMP that includes BMPs. • Provide water quality control of the first 0.5-inch of runoff from the site. • Maintain pre-project 2-yr runoff. • No Adverse Impact Downstream. • Additionally in CSO Permit Area: Maintain pre-project conditions for 2-, 10-, and 100-yr events.
City of Omaha Municipal Code, Chapter 32, Section 32-121 to Section 32-123	• Provide water quality control of the first 0.5-inch of runoff • Maintain the peak discharge rate during the 2-yr event to baseline conditions • For significant redevelopment projects not requiring a grading permit, control of the first 0.5-inch of runoff is not required.
NPDES Permit NE0133698 - Omaha MS4 (October 1, 2008)	• Requires implementation of control measures and other mgmt. practices to reduce pollutants in storm water discharges to the maximum extent practicable.

Document	Requirement
Amendments to the Stormwater Element of Omaha's Master Plan	Policy Group 1: • For all new developments, provide water quality control of the first 0.5-inch of runoff and maintain the peak discharge rate during the 2-yr event to baseline conditions • Encourage establishment of buffer strips along streams • Mitigate impacted wetlands at a 3:1 ratio Policy Group #2 • Peak discharge rates not to exceed 0.2 cfs/acre for the 2-year storm and 0.5 cfs/acre for the 100-year storm. • Significant redevelopment - no net increase in 2-, 10-, and 100- yr peak discharges

Table 2: Existing Project Type and Requirements

Project Type	Requirements	Reference for Requirements	Concerns/ Notes
Regional System Implementation			
Storm Drainage Systems	Minor systems designed for 10-year conveyance Major systems designed for 100-year conveyance Control flow rates to 2-, 10-, 100- year through regional retention/ storage	Omaha Regional Design Manual	Decision making on balance between opportunities for storage (impoundments) and existing conveyance capacity would involve significant cost evaluations The general philosophy used with respect to regional drainage is to prevent adverse downstream impacts, primarily from a capacity/ flooding perspective.
Drainage Systems in CSO areas	Drainage design on case by case basis in retrofit mode. Water quality control of ½" runoff.	Omaha Green Solutions Site Suitability Assessment and BMP Selection Process Guidance Document Chapter 32 municipal code	Separation projects are being implemented to improve conditions of basement flooding and other complaints. Generally seek to address local or area wide system bottlenecks cost effectively. Focus is on flooding control. In separation areas, new storm sewers are preferred as they have preference in rights of way. Once a new storm sewer is installed it typically is sized for a 10-year event.
Private Development/ Parcel Projects			
Platted Development (pre-2008)	PCSMP that includes BMPs Water quality control first ½" runoff (where reasonably practical) Pre-project 2-yr runoff rate maintained No adverse downstream impacts	Chapter 32 municipal code; Omaha Regional Stormwater Design Manual; Post Construction Stormwater Mgmt. Planning Guidance	Municipal code requirements are to prevent adverse impacts downstream. The 2-year runoff rate is considered to be related to channel protection. 10 and 100 year events are related to flood control (and are per the Omaha Regional Design Manual). The language is strictly related to flow rate and not flow volume. Coordination between stormwater and planning to ensure that concepts carry through the platting process.
Platted Development (post 2008)	PCSMP that includes BMPs Water quality control first ½" runoff Pre-project 2-yr runoff rate maintained No adverse downstream impacts	Chapter 32 municipal code; Omaha Regional Stormwater Design Manual; Post Construction Stormwater Mgmt. Planning Guidance	Municipal code requirements are to prevent adverse impacts downstream. The 2-year runoff rate is considered to be related to channel protection. 10 and 100 year events are related to flood control (and are per the Omaha Regional Design Manual). The language is strictly related to flow rate and not flow volume. Coordination between stormwater and planning to ensure that concepts carry through the platting process.
New Development or "significant redevelopment" > 1 acre (that does not require platting) in non-CSO areas	PCSMP that includes BMPs Control pre-project runoff rate for 2-, 10-, and 100-year (proposed chapter 8) events; "control the water quality volume (where reasonably practical)"; no adverse impact downstream	Chapter 32 municipal code; Omaha Regional Stormwater Design Manual; Post Construction Stormwater Mgmt. Planning Guidance	Municipal code requirements are to prevent adverse impacts downstream. The 2-year runoff rate is considered to be related to channel protection. 10 and 100 year events are related to flood control. The language is strictly related to flow rate and not flow volume. The 10- and 100- year control levels are referenced in the proposed chapter 8 of the Omaha Regional Stormwater Design Manual. Stormwater flow rate requirements for redevelopment projects are based on prior ("pre-project") land use **not** "undeveloped" land use. Where a redevelopment site is in an area where previous development was demolished/ vacated, 2004 is used as a reference year for the level of imperviousness that corresponds with the "pre-project" conditions. The ½ inch treatment requirement applies to all runoff from the property. The "where reasonably practical" language results in use of manufactured treatment devices (which are to be pre-approved) versus LID practices (which are the City's preference). The manufactured devices are generally used where space is not available.

Project Type	Requirements	Reference for Requirements	Concerns/ Notes
New Development or "significant redevelopment" > 1 acre in CSO areas	PCSMP that includes BMPs Control pre-project runoff rate for 2-, 10-, and 100-year events; "control the water quality volume"; no adverse impact downstream	Chapter 32 municipal code; Omaha Regional Stormwater Design Manual; Post Construction Stormwater Mgmt. Planning Guidance	Municipal code requirements are to prevent adverse impacts downstream. The 2-year runoff rate is considered to be related to channel protection. 10 and 100 year events are related to flood control. The language is strictly related to flow rate and not flow volume. The 10- and 100- year control levels are referenced in the proposed chapter 8 of the Omaha Regional Stormwater Design Manual. Stormwater flow rate requirements for redevelopment projects are based on prior ("pre-project") land use **not** "undeveloped" land use. Where a redevelopment site is in an area where previous development was demolished/ vacated, 2004 is used as a reference year for the level of imperviousness that corresponds with the "pre-project" conditions. The ½ inch treatment requirement applies to all runoff from the property. The "where reasonably practical" language results in use of manufactured treatment devices (which are to be pre-approved) versus LID practices (which are the City's preference). The manufactured devices are generally used where space is not available.
Significant redevelopment >5000 SF but less than 1 acre	PCSMP that includes BMPs Control pre-project runoff rate for 2-year events; no adverse impact downstream	Chapter 32 municipal code; Omaha Regional Stormwater Design Manual; Post Construction Stormwater Mgmt. Planning Guidance	
Private property "rehabilitation"	None		Rehabilitation projects are generally maintenance in nature. They do not include changing grades, tapping sewers or adding entrances (off of streets). An example would be a mill and resurface on a parking lot.
Right-of-Way or linear project			
Municipal Project (transportation) In CSO area Not in CSO area	There are no requirements for municipal projects in CSO areas No requirements		• In routine City projects, either in CSO or stormwater areas, there is no inherent requirement to control flow rates to predevelopment, including projects that increase imperviousness (such as road widening). • Nebraska Department of Roads (NDOR) has a requirement for control of the first ½" of runoff from a water quality perspective. Actual implementation of this requirement will be occurring for more recent NDOR funded projects.
Municipal CSO project	Water quality control of ½" runoff	Based on Chapter 32 municipal code	• CSO projects included an initial evaluation of green infrastructure benefits if 1" of rainfall capture was achieved. This was used in the planning process and is not an implementation criterion. The initial CSO project evaluation was primarily focused on regional facilities. As projects are implemented, treatment of a ½" water quality volume is considered as an objective, but is not a requirement. • Where sewer separation projects are resulting in flow to new stormwater outlets, the evaluation of the ½" water quality volume does not change (versus those projects where flow recombine downstream). Consideration of enforcing the ½" water quality control volume for new storm outlets may receive greater attention based on receiving water (e.g. Papillion Creek versus Missouri River). .

C. EXISTING POLICIES, PROCEDURES AND GUIDANCE

Below is a summary of each document reviewed. The summary includes a reference to the authority from which the document draws, and applicable exceptions to the requirement, and an excerpt of the requirement from the document. This section is divided into two sections; 1) document with stormwater-related requirements, and 2) documents with stormwater-related recommendations.

1. DOCUMENTS WITH STORMWATER-RELATED REQUIREMENTS

a. Omaha Regional Stormwater Design Manual (April 2006)

http://www.cityofomaha.org/pw/images/stories/pdfs/Stormwatermanual.pdf

Authority: SW Manual to be adopted by Omaha City Council. Regulations are located in Municipal Code Section 32 Article V, although the code references this document.

Exceptions: "The standards should not be construed as rigid criteria. The criteria are intended to establish guidelines, standards and methods for sound planning and design. The City may set aside these criteria in the interest of the health, safety, convenience, order and general welfare of the community. In the planning of drainage improvements in built-up areas, it is recommended that the design approaches presented be adjusted to optimize the benefit to cost ratio." (Page 1-7)

Requirement Excerpt:

Page 1-4

1.5.2.1 Minor Drainage System

The minor drainage system is typically thought of as storm drains and related appurtenances, such as inlets, curbs and gutters. For residential areas, downtown areas, and industrial/commercial areas in Omaha, the minor drainage system design will provide capacity and management for the 10-year return frequency storm runoff, under assumed ultimate upstream development conditions.

During design, the hydraulic grade line for all enclosed systems shall be determined to ensure that inlets act as inlets, not outlets. All easements for newly constructed storm drainpipe should be a minimum of 30 feet wide. In situations where the engineer can clearly demonstrate that an easement less than 30 feet is adequate, the City may consider such a request. Easements wider than 30 feet may be necessary for storm drainpipe and surface water flowage where a drainageway must be designed and maintained to carry stormwater flow in excess of the storm drainpipe capacity.

1.5.2.2 Major Drainage System

The major drainage system is designed to convey runoff from, and to regulate encroachments for, large, infrequently occurring events. When development planning and design do not properly account for the major storm flow path, floodwaters will seek the path of least resistance, often through individual properties, thus causing damage. An assured route of passage for major storm floodwaters should always be provided such that public and private improvements are not damaged. For subdivisions in Omaha, this need is to be provided for both in watershed headwaters settings and along major drainageways.

The 100-year return frequency storm under assumed ultimate upstream development conditions shall be the major drainage system design storm for all new developments. Runoff from major storms should pass through a development without flooding buildings or homes. Overland flow routes can be provided using streets, swales, and open space.

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2.4.2 Frequency Design Criteria

Cross Drainage: Cross-drainage facilities transport storm runoff under roadways. The cross-drainage facilities shall be designed to convey (at a minimum) the 50-year runoff event with a minimum of two (2) feet of freeboard as defined in Chapter 4. The allowable depth of an overtopping event (for greater than a 50-year storm) is limited as indicated in Chapters 3 and 4 of this manual. The flow rate shall be based on upstream ultimate builtout land-use conditions as defined in the policies of the adopted Papio Watershed Plan.

Storm Drains: A storm drain, and attached piping shall be designed to accommodate the peak flow rate from a 10-year storm event. The design shall be such that the storm runoff does not: increase the flood hazard significantly on adjacent property; or encroach onto the street or highway so as to cause a safety hazard by impeding traffic, emerging vehicles, or pedestrian movements to an unreasonable extent.

Based on these criteria, a design involving temporary street or road inundation is acceptable practice for flood events greater than the design event but not for floods that are equal to or less than the design event. Thus, if a storm drainage system crosses under a roadway, the design flood must be routed through the system to show that the roadway will not be overtopped by this event. The excess storm runoff from events larger than the design storm may be allowed to inundate the roadway or may be stored in areas other than on the roadway until the drainage system can accommodate the additional runoff.

Omaha Regional Stormwater Design Manual 2 - 5

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Inlets: Inlets shall be designed for the peak flow rate from a 10-year storm event.

Detention and Retention Storage Facilities: Storage facilities should be designed to provide sufficient storage and release rates to manage the 2-, 10-, and 100-year design storm events to be consistent with the policies and requirements of the adopted Papio Watershed Plan.

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1.5.7 NPDES Construction Site Activities

A NPDES notice of intent and a Stormwater Pollution Prevention Plan (SWPPP) shall be required before land disturbance or vegetation removal activities occur on any site 1.0 acre or greater in size (see Chapter 9). Structural and non-structural best management practices (BMPs) may be required to address stormwater quality enhancement.

b. Omaha Regional Stormwater Design Manual, Chapter 8, Draft (June 2012)

Authority: Municipal Code Section 32, Article V and Municipal Code Section 53-11, Cluster Subdivisions

Requirement Excerpt:

Page 8-2

8.2.1.1 Community Objectives and Performance Standards

Community objectives and performance standards control the infrastructure necessary to sustain a development. Stormwater quality goals are often supported by defining ways to achieve community performance standards with design criteria that accentuate community values while minimizing health and safety concerns. Additional considerations include:

- ***Building Density / Lot Size*** –Zoning regulations and subdivision regulations often dictate allowable building densities and lot sizes for specific land uses and, consequently, the stormwater volume, rate, and pollutant load. Impervious area reductions, stream buffer zones, and stormwater BMP sites may be accommodated by regulations in Municipal Code Section 53-11 Cluster Subdivisions that allow clustering to protect open spaces.

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8.2.1.2 Environmental Objectives and Performance Standards

Environmental objectives and performance standards typically are framed by local, regional and state environmental regulations, and permit requirements. Many environmental objectives also achieve community objectives, enhancing the overall quality of life of residents. This section discusses how to establish environmental objectives and performance standards based on these regulations, permit requirements, and other considerations that typically affect projects in the Omaha region.

In the Omaha region, stormwater management regulations include those that make up the National Pollutant Discharge Elimination System (NPDES) for Municipal Separate Storm Sewer Systems (MS4), Construction Sites, Industrial Permits, and Combined Sewer Overflow (CSO) permit. The NPDES program regulates the quality of stormwater runoff. Post-construction stormwater management plan (PCSMP) requirements evolved as a program requirement in the MS4, but it applies throughout Omaha's corporate limits plus a 3 mile extra territorial jurisdiction (ETJ), i.e., it applies to areas covered by both the MS4 AND the CSO permit.

The PCSMP requirements apply to new land development and significant redevelopment that discharge to the City's MS4 or combined sewer system. New land development includes development projects in areas not previously built to urban uses (including but not limited to farmland, pasture, woodland, and green space). Significant redevelopment includes development projects in areas that are currently built to urban and suburban land uses, and are being revitalized with rehabilitation of existing structures, or demolition of existing structures and construction of new ones. These developments are required to control the WQCV.

In addition to controlling the WQCV, new development or re-development projects must maintain a "No Adverse Impact" condition. "No Adverse Impact" for the purpose of meeting the post-construction stormwater requirements is defined as no increase in the pre-project runoff rate for the 2-, 10-, and 100-year runoff rate for post project conditions. The only exception to this requirement is in cases where the project discharges *directly* to one of the existing regional detention facilities associated with the Papillion Creek Watershed (i.e., Zorinsky Lake, Glenn Cunningham Lake, or Lake Wehrspann) or to the Missouri River. Other demonstrations of a "No Adverse Impact" may be possible on a case-by-case basis.

The design, implementation, and maintenance guidelines provided in this Chapter are intended to assist developers in meeting the performance standards outlined in Municipal Code Section 32 Article V and are primarily aimed at providing control of the WQCV. Many of the BMPs discussed here can also be used to provide peak flow attenuation in order to achieve a "No Adverse Impact" condition. Chapter 2, Chapter 6 and Chapter 8 should be referenced when using BMPs for treatment of the WQCV and peak flow attenuation. BMPs not included in this document may be used in new development and redevelopment projects as long as they are preapproved by the City and are designed to control the WQCV.

Projects discharging to the combined sewer system (generally those east of 72nd Street) must control runoff such that there is no net increase in runoff from pre-development con ditions as they existed in October 2002 for 2-, 10-and 100-year storm events. In addition, the City of Omaha may require stormwater detention in areas where there is not adequate downstream sewer capacity. The applicant should meet with the City of Omaha Public Works Department to verify these requirements for each individual development.

c. City of Omaha Post-Construction Stormwater Management Planning Guidance (November 2011)

http://www.omahastormwater.org/images/stories/Development/PCSMP%20Guidance%20Document%20FINAL%207-23-09.pdf

Authority: Chapter 32, Article V of the Omaha Municipal Code
"No Adverse Impact" - Chapter 32, Article VII of the Omaha Municipal Code
CSO Areas: CSO Permit

Requirement Excerpt:
Page 2

Stormwater Management Guidance Summary

Stormwater Management Requirements in CSO Permit area (refer to attached figure ES-2)

- PCSMP (control first ½" of runoff)
  - Reference: Chapter 32, Article V of the Omaha Municipal Code.
  - Refer to Table 1 for specific requirements
  - The PCSMP requirement exists in the CSO areas because once the sewers are separated; the area will then fall under the MS4 permit.
- Maintain pre-project conditions (as they existed in 2002) for 2-, 10- and 100-yr events.
  - This is a result of the requirement in the CSO Permit. One of the 9 minimum controls is "no increase in the magnitude, duration, or frequency of overflows". By maintaining pre-project runoff conditions, this provides engineers and the City a quantifiable means to ensure this requirement is met.

Stormwater Management Requirements MS4 Permit area (areas outside CSO service area)

- PCSMP (control first ½" of runoff and maintain pre-project 2-yr runoff conditions.)
  - The PCSMP program is a result of the requirement in the City's MS4 permit to establish a Post Construction Stormwater Management Program.
  - Reference: Chapter 32, Article V of the Omaha Municipal Code.
  - Refer to Table 1 for specific requirements.
- Maintain "No Adverse Impact" condition
  - This policy is outlined in the Land Use element in the City of Omaha Master Plan. http://www.cityofomaha.org/planning/comprehensive-plan (Land Use Element, p 10 and 63). The policy is based on the NRD's recommended practice for the Papillion Creek Watershed.
  - The No Adverse Impact approach "assures that the action of one property owner or a community does not adversely impact the properties and rights of other property owners, as measured by increased flood peaks, flood stage, flood velocity, erosion, sedimentation and costs now and costs in the future."
  - Reference: Chapter 32, Article VII of the Omaha Municipal Code.

Table 1: Post-Construction Stormwater Management Plan (PCSMP) Applicability	
Development	**Requirement**
(1) For all developments with a preliminary plat approved by City Council on or after July 1, 2008 (2) For any replat in a preliminarily platted subdivision approved by City Council before July 1, 2008 that significantly increases the amount of impervious area (if required by the Planning Director)	PCSMP that includes BMPs. Provide water quality control of the first ½" of runoff from the site. Maintain pre-project 2-yr runoff. No Adverse Impact Downstream
(1) For all developments with a Preliminary Plat approved by City Council before July 1, 2008 (2) For all development or significant redevelopment that disturbs 1 acre or more and does not require preliminary platting	PCSMP that includes BMPs. Where reasonably practical, provide water quality control of the first ½" of runoff from the site. Maintain pre-project 2-yr runoff. No Adverse Impact Downstream
Significant redevelopment that adds or replaces less than 1 acre but more than 5,000 SF of surface area [1,2,3] Includes: (1) The expansion of a building footprint (2) Addition or replacement of a structure (3) Replacement of impervious surface that is not part of a routine maintenance activity (4) Land disturbing activities related to structural or impervious surface	PCSMP that includes BMPs. Maintain pre-project 2-yr runoff. No Adverse Impact Downstream
Significant redevelopment involving an outlot parcel that is part of existing development	PCSMP with BMP's. Water quality control of the first ½" of runoff for *impervious area.* Maintain pre-project 2-yr runoff conditions. No Adverse Impact Downstream

[1]Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety.

[2]Control of the first ½" of runoff in these cases is not required, however, the applicant must demonstrate that best management practices are included.

[3]Projects that disturb more that 5000 sq ft, but result in less impervious area are addressed on a case by case basis as far as whether a PCSMP is required

d. City of Omaha Municipal Code, Chapter 32, Section 32-121 to Section 32-123

http://library.municode.com/index.aspx?clientID=10945&stateID=27&statename=Nebraska
(Accessed September 18, 2012)

Authority: Omaha ordinance

Exception: "Systems designed to accommodate only one single family dwelling unit, duplex, triplex, or quadraplex, provided the single unit is not part of a larger common plan of development or sale, are exempt from the requirements in this chapter to submit a PCSWMP." (Section 32-123)

Requirement Excerpt:

Sec. 32-121. - Requirement for all new development and redevelopment projects.

Land development and significant redevelopment projects with the potential to add pollutants to stormwater or to affect the flow rate or velocity of stormwater runoff after construction is completed must include provisions for the management of the increased post construction runoff in a post-construction stormwater management plan.

(Ord. No. 37395, § 1, 6-13-06)

Sec. 32-122. - Post-construction stormwater management plan.

For all developments that have not had a preliminary plat approved by the city council prior to July 1, 2008, the post-construction storm water management plan, at a minimum, shall include low impact development (LID) BMPs to provide for water quality control of the first one-half inch of runoff from the site and shall maintain the peak discharge rates during the two-year storm event to baseline land use conditions, measured at every drainage outlet (storm water discharge) from the new development or significant redevelopment, and include the BMP or BMPs selected, the BMP design, schedules and procedures for inspection and maintenance of the BMPs. Provisions for BMPs are set forth in the Omaha Regional Stormwater Design Manual. The director may also require this minimum control level for replats that significantly increase the amount of impervious area in a preliminarily platted subdivision, which was approved by the city council prior to July 1, 2008.

For all developments with plats preliminarily approved by the city council prior to July 1, 2008 and for any sites requiring a permit under section 32-101 and for significant redevelopment projects, the post-construction storm water management plan, at a minimum, shall include the BMP or BMPs selected, the BMP design, schedules and procedures for inspection and maintenance of the BMPs, and for any sites requiring a permit under section 32-101 and where it is reasonably practicable, include BMPs for water quality control of the first one-half inch of runoff from the site. Provisions for BMPs are set forth in the Omaha Regional Stormwater Design Manual. For significant redevelopment projects that do not require a permit under section 32-101 or that involve replacement of building structures without significant disturbance of existing parking or other pervious areas, BMPs for water quality control of the first one-half inch of runoff from the site shall not be required. For significant redevelopment projects involving an outlot parcel that is part of a greater existing development, the calculation of the area requiring control of the first one-half inch of runoff shall be based only on the impervious area of the project site that is being added or disturbed within the outlot parcel.

(Ord. No. 37395, § 1, 6-13-06; Ord. No. 38222, § 2, 8-26-08; Ord. No. 38544, § 1, 10-20-09)

Editor's note—

At the direction of the city, the amendment to § 32-122 by Ord. No. 38486 has not been codified, as the ordinance is currently under review.

e. NPDES Permit NE0133698 - Omaha MS4 (October 1, 2008)

Authority: Federal Water Pollution Control Act 40 CFR 122.269d)(2)(iv) and the Nebraska Environmental Protection Act Title 119, Chapter 10 004.02D

Requirement Excerpt:

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D. Compliance to the Maximum Extent Practicable

Pursuant to state regulation Title 119, Chapter 10 004.02D and federal regulation 40 CFR 122.26(d)(2)(iv). This permit requires implementation of control measures and other management practices to reduce pollutants in storm water discharges to the maximum extent practicable. Narrative effluent limitations (a narrative description of the program elements and measurable Best Management Practices (BMP) goals) requiring implementation of BMPs will be used to reduce pollutants and protect water quality to the maximum extent practicable. Program elements will include management practices, control techniques, and system design and engineering methods and such other provisions that are appropriate.

f. Amendments to the Stormwater Element of Omaha's Master Plan (Interoffice Memorandum, Planning Department, June 15, 2009)

Authority: Adopted by City Council

Requirement Excerpt:

Policy Group #1 – Water Quality Improvements (renamed from Pollution Control)

- Water Quality Low Impact Development (LID) is required for all new developments
- Control of the first half inch of stormwater runoff
- No net increase in peak discharge for the 2 year storm event
- Encourage establishment of buffer strips and riparian corridors along streams
- Mitigate impacted wetlands at a 3:1 ratio
- Water quality basins as identified in the Watershed Management Plan

Policy Group #2 – Peak Flow Reduction

- Regional detention basins as identified in the Watershed Management Plan
- Maximum LID as identified in the Watershed Management Plan.
- Peak discharge rates not to exceed 0.2 cfs/acre for the 2 year storm event and 0.5 cfs/acre for the 100 year storm event
- Significant redevelopment no net increase in 2, 10 and 100 year peak discharges

Policy Group #3 – Landscape Preservation, Restoration, and Conservation

- Natural features and stormwater management techniques to be placed in public right of way or easement
- 3:1 plus 50 foot creek setbacks along streams as identified in the Watershed Management Plan

Policy Group #4 – Erosion and Sediment Control and Other BMPs

- No significant changes

Policy Group #5 – Floodplain Management

- Limit filling in the floodway fringe to 25% of total floodplain area per development application. Remaining fringe area to be designated as a floodway overlay zone.

Policy Group 6 – Stormwater Management Financing

- Water Quality LID funded by development
- Water quality basins and regional flood control reservoirs to be funded 1/3 from development fees and 2/3 from NRD funds (not a change from 2006 policy)
- Stormwater utility encouraged for on-going operation and maintaining city and county NPDES Best Management Practices

b. Changes to the Watershed Management Plan

The watershed map showing the long term plan for managing water has been modified to reflect the changes in the Policies, most notably that:

- Low Impact Development (LID) for water quality will be required for all new development and significant redevelopment across the watershed.
- In the jurisdictions of Douglas and Washington County, Maximum (enhanced) LID will be used for flood control.
- Up to 14 additional regional flood control reservoirs and 12 additional water quality basins may be evaluated for construction in the future.

2. DOCUMENTS WITH STORMWATER-RELATED RECOMMENDATIONS

a. Omaha Green Solutions Site Suitability Assessment and BMP Selection Process Guidance Document

Guidance Summary: Identify and implement opportunities for design practices that encourage innovative thinking to produce multiple benefits, such as enhance environmental protection, contribution to the control of CSO's and economic benefit to rate-payers. Identify and implement natural system enhancements that contribute to the control of CSO's, improve water quality and/or create valuable community enhancements. This document applies to infrastructure improvement projects. Seven goals were developed to support the implementation of the vision statement.

Implementation of Green Infrastructure is envisioned as part of the CSO project process in locations where cost savings can be accomplished. Figure 2 of the document identifies the thought process to be implemented for considering green infrastructure in CSO programs. This process applies well to regional detention facilities that store large volumes and significantly reduce the size of downstream pipes.

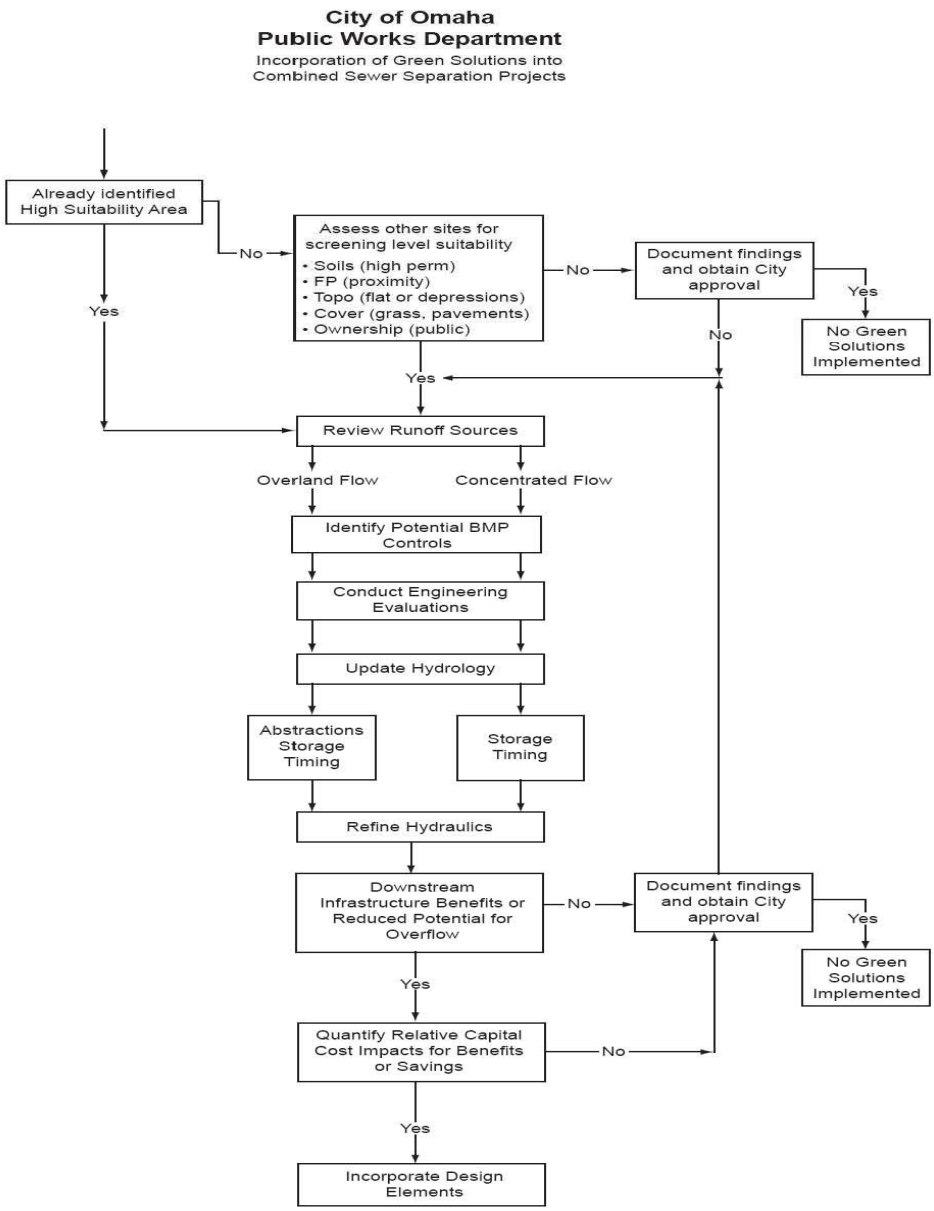

Figure 2: Green Solutions Implementation Flow Chart

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b. U.S. Mayors Climate Protection Agreement (As endorsed by the 73rd Annual U.S. Conference of Mayors meeting, Chicago, 2005)

Guidance Summary: Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO_2. Strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions on our own operations and communities.

c. Omaha Master Plan – Transportation Element (Jim Suttle, Mayor, Report #304)

Guidance Summary: In the Project Ideas Section, projects were grouped into major categories. Applicable categories for LID within the ROW include:

1. Cross Section Modification - most commonly road diets
2. Publicly-led new Street projects - Projects most commonly associated with development projects.
3. Pedestrian Corridor Projects - Typically consist of streetscape projects.
4. Pedestrian Crossing - Site-specific projects refer to pedestrian crossing improvements not necessarily associated with a larger interstection project.
5. Intersection Projects - Vehicle-based safety, operational and capacity projects, but also pedestrian-based crossing improvements.

d. Omaha's Historic Boulevards Master Plan (Draft – August 2012)

Guidance Summary: These principals apply to boulevard projects. The guidelines are meant to provide project managers, city staff and consultants with a design decision-making tool to ensure the preservation of, or expectations for, improvements within the historic Omaha Boulevard's System. [Note that some of the principals in this document may work against some of the efforts to incorporate LID into projects.]

Guiding Principles:
1. Preservation of Existing trees is paramount
2. Preserve existing center medians, curb radii intersections and islands
3. Preserve current horizontal and vertical alignments of Boulevards
4. Implement way-finding and identification throughout the system
5. Preserve and enhance the long, linear expanse of parkway lawn
6. Make use of the pavement width or narrow roadway over time
7. Prevent placement of overhead power lines within or adjacent to ROW
8. Restore historical connections

e. Omaha Master Plan – Environment Element (Jim Suttle, Mayor, Report #302)

Guidance Summary: The focus of this document is on five broad topics including Natural Environment, Urban Form and Transportation, Building Construction, Resource Conservation, and Community Health. Each of these topics is a section within the document and was developed soliciting public and advisory committee input. The document is primarily a compilation of goals and objectives surrounding the five topics. The subject of stormwater surfaces several times throughout the document expressing the following guiding principles:

1. Use natural treatment solutions to address water quality.
2. Improve water quality in the metropolitan area to meet or exceed state and federal regulations.
3. Base stormwater management plans on the characteristics of each watershed.
4. Encourage the use of green roofs, green walls, and rainwater harvesting techniques to reduce runoff volume and improve water quality.
5. Optimize the on-site retention and re-use of storm water generated from building sites.
    a. Encourage the use of narrower streets and permeable paving.
    b. Utilize rain gardens and open drainage systems to reduce volume and speed of runoff and to improve water quality.
    c. Encourage the use of green infrastructure to meet federal CSO mandates.
    d. Provide for rainwater harvesting in the City code.
    e. Ensure that stormwater and erosion controls are installed and maintained during construction.
    f. Ensure that City staff levels are adequate so that storm water site plan review and on-site inspection occur in a timely manner.
6. Educate the public about stormwater management practices including how to install rain gardens, rain barrels, green roofs, and cisterns.

D. DISCUSSION/CONCLUSION

Of the thirteen documents reviewed for stormwater-related requirements and recommendations, six contained authoritative requirements. The six documents were primarily based on the authority of the Municipal Code Section 32, Article V and the Papillion Watershed Management Plan. The document with the most extensive definition of requirements is the City of Omaha Post-Construction Stormwater Management Planning Guidance (November 2011). Generally, the documents do not contradict each other but some provide more detailed information as to which scenarios the requirements apply.

E. BARRIERS AND ACTIONS

As part of the review of documents and the project kick-off meeting, a discussion regarding various barriers to implementation of green infrastructure was held. A summary of various barriers and current status is included as Table 3.

Table 3: Barriers, Goals and Actions

Barrier	Description of Barrier	Current Status/ Action to Date	Goals or Required Objectives to Achieve	Short Term Actions Required	Long Term Actions Required
Funding/ Economics (municipal projects)	• Cost justification for including green infrastructure/ stormwater quality management has no way to assess value outside of project capital costs. • Limited dedicated stormwater funding sources. No specific source of funds for capital projects.	• Adopted concept of including green if cost neutral or otherwise feasible.	• Increase incorporation of green infrastructure on projects though a consideration of broader/ longer term benefits.	• Develop a stronger business case for the value of doing green based on a variety of direct, tangible benefits (examples include: reduced CSO facility size [potentially], reduced flow rates to downstream storm sewers that lack capacity, reduced pavement maintenance [street diets], and improved capacity of local sewers [if new sewers can be avoided]). Consider this based on a 20 – 30 year present value consistent with bonding cycles. Consider life-cycle cost including O&M. [Task 2] • Define broader set of economic and non-economic benefits that are clearly understandable to the community [Task 2]	• Add additional specifics to process for evaluating green versus gray • Consider implementation of highly effective retrofit projects targeting impervious areas.
Political	• External ratepayers are highly sensitive to expenditure of sewer funds on project elements not seen as essential • Requirements are very difficult to modify – developed regionally for MS4 program • Prefer redevelopment within the City to sprawl in undeveloped areas.	• Accomplished adoption of standards calling for BMPs	• Green infrastructure adaptation defensible to ratepayers.	• Need to be able to demonstrate value of SW mgmt./ green infrastructure to the broader stakeholder [Task 2]	• Need to be able to demonstrate cost neutrality, provide supportive funding or lesser requirements

Clarity of Requirements	• No requirement for municipal projects located within the right-of-way.
	• A primary requirement is to limit flow increases relative to a 2004 base year.
	• Historic requirements relate to flood control rather than stormwater quality/ green infrastructure. Tends to drive design
	• Redevelopment versus rehabilitation triggers are not clear to the public
		• PCSMP adopted as routine expectation; BMP adopted as routine expectation; ½" water quality volume treatment adopted as routine expectation
		• CSO program adopted policy of ½" runoff treatment
		• NDOR has ½" water quality treatment requirement
			• Develop standard for municipal right of way projects
			• Reduce or eliminate "off-ramp" language (define "feasibility")
			• Identify requirements to meet longer term/ variety of objectives
			• Clarify standards for redevelopment to higher level of control than "existing conditions".
				• Consider requirements that would apply to municipal projects with increased imperviousness (e.g. road widening). [Task 3, 4]
				  ○ Review definitions
				  ○ Clarify standards
				  ○ Work within existing requirements; modify process only
					• Revise standards, expectations to meet future requirements such as various levels of control

Barrier	Description of Barrier	Current Status/ Action to Date	Goals or Required Objectives to Achieve	Short Term Actions Required	Long Term Actions Required
Internal Understanding/ Concerns	• Internal appreciation of the need for SW mgmt. is lacking • NDOR funding and the EIS process limit the ability to make changes • Maintenance and who pays for maintenance (e.g. parks projects, streets). Internal road engineers generally skeptical of LID practices.	• Closer coordination between design division and stormwater manager has improved incorporation of green infrastructure	• Better definition of stormwater requirements for road projects	• Better definition of downstream stormwater capacity assessment required for reconstruction projects. • Clarify critical timelines for NDOR funded projects that involve EIS and which projects are beyond the point at which modifications can be made. [Task 3, 4]	• Develop design templates [started under Task 4] • Revisit some NDOR funded projects if early (enough) in project definition • Define street width for various streets and triggers for implementation
Process	• Lack of coordination between stormwater and planning • Platting process – changes that occur and are not sufficiently reviewed before approval • Electronic documents review is not fully implemented and is currently cost prohibitive.	• Moving toward more of an electronic plan review process	• Maximize implementation of green infrastructure	• Develop description of process [Task 3]	• Continue to move toward electronic system • Revise process to increase participation
Standards	• Design standards are built around flood protection. Tiered (dual) system of standards for water quality and flood protection is not understood/ embodied in practice. • Process for changing standards is long, requires consensus and is political	• The City has worked to update standards to better incorporate green infrastructure	• Standards require no net increase in runoff. Goal is to decrease runoff rate.	• Clarify design standards based on downstream capacity limitations [Task 3] • Clarify design standards (dual water quality and flood protection) and how they apply to municipal right-of-way projects. [Task 3] • Attempt to work within established standards to frame process. [Task 3	• Implement ordinance for right-of-way projects to comply with standards comparable to parcel projects. • Redo Papillion Watershed Management Plan to better address water quality. Currently based on flood control. This plan influences the standards adopted inside and outside of the Papillion Watershed.
Post Construction Requirements for Private Development	• Exception language for redevelopment where imperviousness is not increased	• Requirements established based on flow control to the 2004 baseline year.	•	• Clarify current practice and requirements. [Task 3]	•