Sustainable Infrastructure Policy Gap Analysis

Prepared by:
The Metropolitan Sewer District of Greater Cincinnati
Hamilton County Regional Planning Commission

Interim Report
January 2012

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Background

The Metropolitan Sewer District (MSD) is among the top five Combined Sewer Overflow (CSO) dischargers in the country, discharging approximately 14-billion gallons of overflow during a typical year of rainfall. MSD is implementing an integrated, watershed based approach to reducing CSO volume by evaluating solutions using Direct and Enabled approaches.

Direct Impact Projects are projects and assets that MSD owns and operates to reduce flow entering the system through strategic separation of stormwater and natural drainage. *Enabled Impact projects* are very similar; however differ in that they rely on partnerships with public and private entities to implement source control solutions to reduce stormwater from entering the combined system. To date, MSD has developed partnerships to install green infrastructure practices on both private and public property which have an estimated removal of approximately 75 million gallons of stormwater from the combined system.

Given the scale of MSD's CSO volume, Direct Projects – such as source control through strategic separation, detention, stream separation and other sustainable infrastructure techniques - play a lead role in MSD's watershed based approach and is estimated to have the most impact of achieving MSD CSO reduction goals. However, Enabled Impact Projects can provide additional value and benefits that can lead to greater understanding and support of Sustainable Infrastructure design, implementation and benefits. Development of partnerships with both public and private entities has been a key success factor in the implementation of the Enabled Impact projects. While the codes and ordinances allow the installation of innovative technologies, EIP program has shown us that there are opportunities to enhance the building municipal codes and other city regulations and permitting authorities to help incentivize or encourage the use of sustainable stormwater practices on private property and within other public investments where opportunity exists.

Purpose

The Metropolitan Sewer District of Greater Cincinnati (MSD) in collaboration with the Communities of the Future Advisory Committee (CFAC) Policy Subcommittee, Hamilton County Planning and Development, and the City of Cincinnati Planning Department performed a *Sustainable Infrastructure Policy Gap Analysis,* hereafter called Policy Gap Analysis. The purpose of this Policy Gap Analysis is to analyze the current rules and regulations, codes, policies, and incentives that regulate sustainable infrastructure practices and determine how they may either impede or encourage their widespread use and minimize the degradation of water resources in Cincinnati and Hamilton County.

Sustainable infrastructure practices may include both "green and grey" stormwater infrastructure. Grey Infrastructure refers to traditional conveyance and collection water management and treatment systems. Green Infrastructure refers to management approaches and technologies that seek to preserve, maintain, mimic or restore inherent functions and hydrologies of the natural landscape. Green Infrastructure focuses on techniques that use soils and vegetation to infiltrate,

evapotranspirate, and/or recycle stormwater runoff. Green infrastructure is closely associated with Low Impact Development (LID) practices and technologies such as bio-swales, rain gardens, wetlands, although it also includes other methods such as preservation and restoration of the natural landscape. To address the challenges associated with combined sewer overflows and EPA Consent Decrees, municipalities including Cincinnati, Philadelphia, Milwaukee, Seattle, Portland, and Chicago are combining green and grey technologies and practices into holistic sustainable infrastructure frameworks.[1,2]

This analysis is timely because it offers opportunities to leverage MSD's "green and grey" infrastructure investments by ensuring a consistent and supportive regulatory environment. Improving the stormwater regulatory environment provides long-term benefits well beyond the MSD Lower Mill Creek Partial Remedy submittal to the Government Regulators in December 2012.[3] This analysis also addresses the necessary steps for the City of Cincinnati, as a member of the Hamilton County Storm Water District, to comply with the Ohio EPA stormwater National Pollution Discharge Elimination System (NPDES) Phase II MS4 (Municipal Separate Storm Sewer System) permit requirements. Thus, there are two separate purposes of this document. Both are timely, with the MS4 action needed as soon as possible in 2011 or early 2012. The work on Consent Decree-related matters would be addressed in mid 2012.

By establishing new or updating existing regulations for stormwater management, there is an opportunity to:

1. Reduce the discharge of combined sewer overflows from the combined sewer system owned and operated by MSD;
2. Reduce the discharge of pollutants from the municipal separate storm sewer systems owned and operated by the City of Cincinnati and other jurisdictions in the MSD service area;
3. Protect and improve water quality;
4. Enable the City of Cincinnati to comply with the NPDES Phase II MS4 permit and applicable federal and state regulations as a member of the Hamilton County Storm Water District; and
5. Satisfy applicable state and federal water quality requirements.

Focus

The primary focus of this Policy Gap Analysis is to assess the relevant codes, ordinances, rules and regulations that pertain to the City of Cincinnati Municipal Code, Stormwater Management Utility (SMU), Hamilton County Stormwater District (HCSWD), and the Metropolitan Sewer District of Greater Cincinnati (MSD) in the context of over thirty identified policy areas. The analysis of the City of Cincinnati Municipal Code includes all necessary sub-chapters (i.e. City Building Code, Parking Code, Plumbing Code, etc.) as they relate to each stormwater or sustainable infrastructure issue/area.

A major focus of this analysis was to assess the hurdles to sustainable infrastructure implementation created by insufficient, out-dated or conflicting, code, rules and regulations. Based on industry practice and research, green infrastructure practices such as swales, pervious pavement, cisterns and water reuse, among others, are more readily included in construction projects when standards and specifications are clear. Generally, when property owners and developers must navigate additional hurdles, these measures may be viewed as less desirable. Local and state jurisdictions and utilities can address this problem by adopting clear standards and guidelines for sustainable infrastructure techniques.

MSD's, SMU's and the Hamilton County Storm Water District's regulatory requirements for stormwater management for new development and redevelopment sites were another central focus of this analysis. To address these sustainable infrastructure issues proactively, many cities are adopting appropriate and consistent standards for new development and

1 USEPA, "Green Municipalities": http://cfpub.epa.gov/npdes/greeninfrastructure/gicasestudies.cfm#Municipal
2 APA, "Green Infrastructure Storms Ahead": http://www.planning.org/planning/open/mar/greeninfrastructure.htm
3 USEPA, "Benefits of Green Infrastructure": http://cfpub.epa.gov/npdes/home.cfm?program_id=298

redevelopment to minimize the volume of runoff discharged from developed sites. Regional and even local stormwater regulations can be revised to require retention of a sufficient amount of stormwater through infiltration, evapotranspiration, and extended detention to ensure water quality protection. Evaluating our local and regional standards, rules and regulations was one of the key outcomes of this gap analysis.

It is important to clarify that the jurisdiction of MSD for regulating stormwater quantity is only in combined sewer areas that sometimes cross multiple jurisdictions, whereas, the jurisdiction of the City's SMU, is in separated storm sewer systems located in City of Cincinnati limits. It is also important to note that some of the identified stormwater policy "gaps" in this Policy Analysis go beyond the authority of either of these two agencies/districts. In addition, it should be noted that the City is a member of the Hamilton County Stormwater District, which includes 42 out of 48 of the local governmental jurisdictions including all 12 townships in Hamilton County. The Ohio EPA Phase II MS4 NPDES Stormwater Permit issued to the HCSWD covers all its members.

Potential Policy Changes and Enhancements Areas

The policy gaps indentified in this report have the opportunity to be addressed through these primary means.

City of Cincinnati Municipal Code and SMU Rules and Regulations

The first means is through proposed revisions to the City of Cincinnati Municipal Code and SMU Rules and Regulations that would enable the City of Cincinnati to meet NPDES MS4 permit requirements, be consistent with the HCSWD program and surrounding jurisdictions, and provide guidance for the use of sustainable/green stormwater technologies. SMU has undertaken a number of efforts to update the City Municipal Code and the SMU Rules and Regulations. In order to comply with NPDES requirements, SMU has prepared proposed changes to the Municipal Code affecting the Building and Stormwater Management Code. The City Municipal Code draft revisions are planned for submittal to City Council, where they will undergo a public comment period before potential adoption sometime in the first quarter of 2012. SMU has also drafted proposed revisions to several chapters of the SMU Rules and Regulations (other chapter revisions are still in progress); these proposed revisions were reviewed to provide additional information and context for this Policy Analysis.

City of Cincinnati *Land Development Code*

The second means is through the upcoming City of Cincinnati *Land Development Code* (LDC) process, which will analyze all of the various municipal codes, looking for gaps, inconsistencies and conflicting codes. The LDC will consolidate development regulations into a single development code that represents a more consistent, logical, integrated, and efficient means of regulating development. Cincinnati's Land Development Code is the ideal process for addressing many of the land-based stormwater issues and policies such as impervious cover reduction, because it will be incorporating changes to the zoning code, building code, subdivision regulations, parking code and many other codes all at the same time. The Land Development Code process began in 2011 with an expected completion of spring 2014.

MSD Rules and Regulations

The third means is through MSD Rules and Regulations, which regulate the sanitary and combined sewer areas of the City and surrounding jurisdictions. MSD Rules and Regulations are amended or adopted by the Board of Hamilton County Commissioners. The Policy Gap Analysis findings indicate that sustainable infrastructure is generally allowed under existing MSD and SMU Rules and Regulations. However, the Rules and Regulations could be enhanced through the development of implementation guidance such as an updated design manual, so that it is clearer to developers wishing to utilize sustainable infrastructure (i.e. design criteria, maintenance requirements and guidance, steps for review and approval, etc).

Other Local, Regional and State Regulations

While many of the policy gaps will be addressed through the above processes, some will not. Additional means for addressing some of these policy gaps will involve engagement with other regulators such as Greater Cincinnati Water

Works (GCWW) and Ohio EPA. They may also require more focused efforts, for example, the Green Partnership for Greater Cincinnati assembled a Rainwater Harvesting Task Force for Dater Elementary, which is analyzing the rules and regulations that impede the usage of the rainwater harvesting and reuse system at Dater. Task forces like this are able to approach narrowly defined sustainable infrastructure gaps and challenges and are able to work with multiple jurisdictions and municipal departments to identify and encourage solutions that meet the needs of all.

Codes, Ordinances, Rules and Regulations of Primary Focus

The following documents were the primary focus for conducting the Sustainable Infrastructure Policy Gap Analysis. Additional secondary references are listed individually within each stormwater gap.

1. City of Cincinnati Municipal Code – As this Policy Gap Analysis was prompted by a Cincinnati City Council motion, the City of Cincinnati's Municipal Code was the only municipal jurisdiction analyzed at this time. The Policy Gap Analysis analyzed several sections of the City Municipal Code looking for sustainable infrastructure relationships and gaps, including but not limited to these Titles and Chapters of the Municipal Code:

- Title XI – Building Code
  - Chapter 1105 – Plumbing Code
  - Chapter 1109 – Flood Damage Reduction
  - Chapter 1113 – Excavation or Filling of Land
- Title XIV – Zoning Code
  - Chapter 1415 – Riverfront Districts
  - Chapter 1423 – Landscaping and Buffer Yards
  - Chapter 1425 – Parking and Loading Regulations
  - Chapter 1429 – Planned Development Districts
  - Chapter 1431 – Development Control Overlay Districts
  - Chapter 1433 – Hillside Overlay Districts
- Title VII – General Regulations
  - Chapter 719 – Sewers
  - Chapter 720 – Stormwater Management Code
  - Chapter 721 – Streets and Sidewalks, Establishment and Maintenance
  - Chapter 731 – Weed Control
  - Chapter 743 – Urban Forestry

The Cincinnati Municipal Code can be found here:
http://library.municode.com/index.aspx?clientId=19996&stateId=35&stateName=Ohio

2. SMU – SMU's *Rules and Regulations* are based on the statutory authority set by the City of Cincinnati Municipal Code, most specifically Chapter 720 Stormwater Management Code, but other chapters may have sections that apply (e.g. Building Code, Plumbing Code, Subdivision Regulations, etc.). Together, the City of Cincinnati's Municipal Code and SMU's Rules and Regulations are outdated for meeting full compliance with the NPDES Phase II permit requirements. SMU has already drafted and submitted to the Director revised ordinances for the City Municipal Code, and is in the process of updating SMU's Rules and Regulations.
SMU's Rules and Regulations can be found here:
http://msdgc.org/downloads/rule_reg/smu/smu_rules_and_regs.pdf

3. MSD – The MSD *Rules & Regulations*, approved by the Hamilton County Board of Commissioners, contains information on terminology, rates and jurisdiction, which apply to MSD's operations. The MSD Rules and Regulations are an important

focus in this Sustainable Infrastructure Policy Gap Analysis. The MSD Rules and Regulations can be found online: http://msdgc.org/rule_reg/

4. Hamilton County Storm Water District (HCSWD) – The Hamilton County Storm Water District was established under Ohio Revised Code Chapter 6117 to address the stormwater management requirements of the NPDES MS4 permit and to improve water quality on a countywide basis. As mentioned, 42 of 48 local jurisdictions have decided to be members of the HCSWD, including the City of Cincinnati. The Hamilton County Soil and Water Conservation District, Hamilton County Department of Public Works, Hamilton County General Health District and MSD conduct various aspects of the Phase II MS4 program in partnership with member jurisdictions. The HCSWD is responsible for coordinating permit compliance for its member jurisdictions, including the City of Cincinnati. The HCSWD Rules and Regulations are an important focus of this policy analysis because they provide guidance for meeting the NPDES permit requirements. The HCSWD Rules and Regulations can be found online: http://www.hamilton-co.org/stormwater/HCSWD_Rules_And_Regulations.htm

Policy Gap Assessment Tools

The Policy Gap Analysis has been informed and guided by the following assessment and benchmarking tools created by the United States Environmental Protection Agency (USEPA) and the Center for Watershed Protection. Below is a summary of the tools that were used to develop an assessment tool that was simple and streamlined but allowed for the opportunity to develop a more specific assessment tool for the local conditions.

USEPA

Sustainable Design and Green Building Toolkit for Local Governments

The "Sustainable Design and Green Building Toolkit" (2010) provides a useful municipal code and policy benchmarking toolkit.[4] This toolkit is designed for municipalities looking to analyze their existing regulatory system to find barriers that impede sustainable design and green building technologies and techniques. MSD and Hamilton County Planning and Development extracted the applicable sustainable infrastructure and stormwater management sections from this toolkit and invited professionals from Hamilton County Storm Water District, Cincinnati Stormwater Management Utility, and Cincinnati Planning Department to review them at a three-hour workshop meeting on October 24, 2011. The results of the discussion and materials generated at this workshop were used to inform this Policy Gap Analysis document.

Center for Watershed Protection

Post Construction Guidance Manual, Tool #4 – Codes and Ordinances Worksheet

The Center for Watershed Protection's manual "Managing Stormwater in Your Community: A Guide for Building an Effective Post-Construction Program" (2008) provides stormwater professionals with practical guidance, insights, and tools to build effective watershed management programs.[5] The guide is accompanied by several downloadable "tools" including Tool #4: Codes and Ordinance Worksheet. The tools are designed to be flexible for local stormwater managers to help with program implementation. Hamilton County Planning and Development used this tool to conduct a quick analysis of local rules and regulations, which inform this Policy Gap Analysis document.

Hamilton County Planning and Development in Cooperation with the Communities of the Future Advisory Committee

"Toolbox of Land Use Policies and Best Practices for Addressing Stormwater at the Local and Regional Scale" (DRAFT-July 2011)

This report introduces some of the potential land use policies and best management practices the CFAC suggested for incorporation into local planning efforts to further the concepts of integrated watershed planning. These policy tools

[4] USEPA website: http://www.epa.gov/region4/recycle/green-building-toolkit.pdf
[5] CWP website: www.cwp.org

centered on Smart Growth tools for sustainable infrastructure planning (e.g. "right sizing" through land banking and green infrastructure, transfer of development rights, form-based codes, compact development, parking lot stormwater regulations). Cincinnati's Land Development Code is expected to be the best opportunity to incorporate the suggested Smart Growth tools for sustainable infrastructure implementation. Furthermore, suggested tools in this report, like *Green Streets,* are already being tested locally through pilot projects such as MSD's Green Infrastructure Demonstration Program and other efforts.

Ohio Department of Natural Resources (ODNR)

The ODNR "Rainwater and Land Development" Manual has been adopted by the Hamilton County Stormwater District, and SMU by virtue of membership in this district, as standards and specifications for stormwater BMPs.[6] This manual is a great resource for acquiring technical information on the sustainable infrastructure practices that help to protect soil and water features during the site development process. This manual provides valuable information on a variety of sustainable infrastructure types such as proper location, planning considerations and typical long-term maintenance responsibilities. This manual is flexible but it was not meant to provide guidance based on local policies, rules and regulations or site considerations.

[6] ODNR, "Rainwater and Land Development Manual": http://www.dnr.state.oh.us/tabid/9186/Default.aspx

Sustainable Infrastructure Policy Gap Analysis Guide

This document is organized into five categories of stormwater policy areas:

1. Stormwater Codes, Policies and Procedures
2. Wastewater/CSO Codes, Policies and Procedures
3. Green Building and Plumbing Codes, Policies and Procedures
4. Other Sustainable Land Development Code or Policy Issues
5. Sustainable Urban Forests, Greenspace, Other Planning Codes and Policies

The "Stormwater Codes, Polices and Procedures" section focuses on the sustainable infrastructure policy gaps corresponding to the City Municipal Code, most specifically Chapter 720 –Stormwater Management Code, which is applicable in the separated sewer system areas within the city of Cincinnati. The "Wastewater/CSO codes, Policies and Procedures" section focuses on stormwater policy gaps corresponding to the MSD Rules and Regulations and the combined sewer system and sanitary sewer system areas within the MSD service area. The "Green Building and Plumbing Codes, Policies and Procedures" section focuses on the municipal codes that correspond to green building practices and LEED certification. The fourth section on "Other Sustainable Land Development Code or Policy Issues" focuses on the municipal policies that encourage Low Impact Development (LID) and Best Management Practices (BMPs) in areas such as parking lots and public right-of-way. The fifth section on "Sustainable Urban Forest, Greenspace, Other Planning Codes and Policies" focuses on policies that encourage increased tree canopy and the use of native vegetation.

Each page is an analysis of a separate sustainable infrastructure policy issue. The "priority level" does not indicate preference of MSD, SMU, HCSWD or any other party involved in this analysis towards a particular sustainable infrastructure policy approach. Priority is simply a technical assessment of current codes, rules and regulations that pertain to that issue, where there is a need and opportunity to address that issue through one of identified means identified in the above chapter on Potential Policy Changes and Enhancements. For example, filter strips have been identified as a low priority because they are currently expressly allowed by code and detailed in the rules and regulations. This does not indicate an absence from the comprehensive sustainable infrastructure solutions that MSD, SMU, or HCSWD advances through their own investments or advocates to the private development community for new development or redevelopment.

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Sustainable Infrastructure Policy Gap Analysis – Table Summary

This table summary provides a quick snapshot of the findings of the Sustainable Infrastructure Policy Gap Analysis. For a more detailed explanation of each sustainable infrastructure type or BMP, please follow the reference in the left column to the corresponding section.

	Sustainable Infrastructure Type or Stormwater Best Management Practice	Current Situation	Code Resolution Priority Level	Proposed Corrective Action	Timeframe for Resolution
A.1	Flow Rate Limitations (Cincinnati SMU)	Lacks WQv requirement for NPDES	High – NPDES	Adopt WQv requirement	January - February 2012
A.2.a	Green Roofs	Typically Allowed, code silent	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.b	Rain Barrels and Cisterns	Typically Allowed if Installed Properly, code silent	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.c	Filter Strips	Typically Allowed, code silent	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.d	Bioinfiltration/Bioretention	Typically Allowed	High	Local LID and BMP Design Manual	3 to 6 months
A.2.e	Detention Basins	Allowed, desire to have consistent design specifications	High	Explore revisions to SMU and MSD Rules and Regulations for modifications to detention/flow management, Local LID and BMP Design Manual	Multiple Timeframes
A.2.f	Berms and Retentive Grading	Typically Allowed, code silent	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.g	Swales	Typically Allowed	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.h	Constructed Wetlands	Typically Allowed, code silent	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.i	Ponds and Wetlands	Typically Allowed, code silent	High	Explore revisions to SMU and MSD Rules and Regulations for modifications to detention/flow management, Local LID and BMP Design Manual	Multiple Timeframes
A.2.j	Subsurface Infiltration	Typically Allowed	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.k	Subsurface vaults	Typically/Expressly Allowed	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.l	Porous Pavement	Typically/Expressly Allowed	Med	Evaluate through Green Demonstration Program, Local LID and BMP Design Manual	3 to 6 months
A.2.m	Prefabricated Stormwater Treatment Units	Typically/Expressly Allowed	Low	Local LID and BMP Design Manual	12 to 24 months
A.2.n	Inlet Outlet Controls	Typically/Expressly Allowed	Low	Local LID and BMP Design Manual	12 to 24 months
A.3	Standards and Design Metrics Manual	ODNR manual is currently deferred to; desire to have local version to provide guidance and encourage more green infrastructure and BMPs	High	MSD collaborates with SMU, HCSWD to develop Stormwater LID and BMP Design Manual	6-12 months
A.4	Water Quality Treatment and Pollution Prevention BMPs	BMPs designed to collect gross pollutants (i.e. litter, debris, coarse sediment) and treat water quality are typically allowed, code silent	High – NPDES	Anticipate and evaluate near future MS4 permit requirements and be responsive and in compliance with those requirements, increase flexibility for new technologies	Multiple Timeframes
A.5	Post Construction Stormwater Management (NPDES requirement)	Director submitting revised municipal ordinances to meet the PCSM –NPDES requirements	High – NPDES	Adopt Municipal Code revisions submitted by Director, SMU adopts revised PCSM Rules and Regulations chapter	Municipal Code Revisions: January – February 2012, SMU Rules and Regulations Revisions: 6 to 12 months
A.6	Illicit Discharge Detection (NPDES requirement)	Director submitting revised municipal ordinances to meet the	High – NPDES	Adopt Municipal Code revisions submitted by Director	Municipal Code Revisions: January –

	Sustainable Infrastructure Type or Stormwater Best Management Practice	Current Situation	Code Resolution Priority Level	Proposed Corrective Action	Timeframe for Resolution
		Illicit Discharge –NPDES requirements			February 2012
B.1	Flow Rate Limitations (MSD)	Currently Required, revisions are being analyzed	High	Review existing MSD Rules and Regulations	3 to 6 months
B.2	Downspout Disconnection	Currently Prohibited	High	Adopt Municipal Code revisions submitted by Director which would allow under approved circumstances	January – February 2012
B.3	Low Impact Development and Best Management Practices Incentives	Expressly Allowed, some incentives exist but are under-utilized	Med	Evaluate existing incentive programs, explore options for future incentive programs	3 to 6 months, always on-going
C.1	LEED Certification: Soil and Erosion Control	Required by current code, difficult to enforce	High – NPDES	Adopt Municipal Code revisions submitted by Director	January – February 2012
C.2.a	LEED certification: Green Roof Use & Standards	Typically/Expressly Allowed	Low	Local LID and BMP Design Manual	12 to 24 months
C.2.b	LEED certification: Water Use Reduction/ Indoor Reuse	Prohibited by code	Low	Partner with GPGC Task Force on this issue	6 to 12 months
C.2.c	LEED certification: Harvested Rainwater/Recycled Grey Water / Outdoor Reuse (Irrigation)	Typically/Expressly Allowed	Low	Partner with GPGC Task Force on this issue	6 to 12 months
C.3	Soil and Erosion Control (NPDES requirement)	Required by current code, difficult to enforce	High – NPDES	Adopt Municipal Code revisions submitted by Director	January – February 2012
D.1	Sustainable Site Design (e.g. LID, Light Imprint, Conservation Development, etc.)	Expressly Allowed	Low	Explore during Land Development Code	LDC Timeframe
D.2	Parking Lot Stormwater Management	Code silent, Typically allowed	Med	Explore during Land Development Code	LDC Timeframe
D.3	Green Streets	Code silent, Typically allowed	High	Explore during Land Development Code	LDC Timeframe
D.4	Stream/Riparian Corridor Protection (NPDES requirement)	Code silent, Typically allowed	Medium – NPDES	Short Term- Interim Development District, Long Term – Explore options with community during LDC	Mid-term – Interim Development District, Long-Term -LDC
E.1	Native Plants, Greenspace Preservation	Allowed	Low	Recent ordinance revisions corrected this issue for now	LDC Timeframe
E.2	Increased Tree Canopy, Street Trees	Required by Code	Low	Review best practices	LDC Timeframe

A.1

Do the current stormwater codes provide for the limitation of stormwater flow from the development site to predevelopment levels (or less) for flow rate and volume?

Current Situation

SMU's Rules and Regulations currently addresses flow rate limitations from the (re)development site. For volume requirements, the proposed SMU Rules and Regulations changes will entail managing and treating the water quality volume (based on Hamilton County code). The past emphasis has been on peak flow detention to prevent flooding in significant storm events. It has had a relatively small impact on volume of combined sewer overflows because SMU detention and water quality volume (WQv) requirements are applicable only to areas with fully separated storm sewers. For areas with combined sewers, MSD detention requirements are applicable. The new requirements include a water quality element that is in addition to the peak flow requirements. The water quality element requires that the first ¾ inch of rain be retained or detained on the development site. This will most often be accomplished through use of alternative approaches that absorb, infiltrate, filter, store and/or slowly release stormwater from the building site.

Assessment of Current Condition

Limitation of stormwater flow from re/development sites is required by current code ordinance but inadequate to address NPDES MS4 Permit requirements. Existing regulations address peak flow reductions. Currently proposed (drafted) regulations will address water quality volume requirements.

Priority Level: High - NPDES

Proposed Corrective Action

- Research and evaluate the proposed stormwater code, building code.
- Research and evaluate potential MSD Rules and Regulations changes that include the water quality volume (WQv) requirement. Consider applying the requirement in both separated and combined sewer areas and track the volume of CSO flow reduced.

Action Owner

SMU with City Council, MSD with BOCC

Timeframe for Resolution

Building and Stormwater Management Code to be resolved in near term with the January 2012 recommendations to City Council, for proposed ordinance implementation, rules and regulations update will meet NPDES MS4 Permit requirements For MSD Rules and Regulations see B1.

A.2.a

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Green Roofs

Current Situation

Green roofs are generally covered by the City's Building Code and have been allowed selectively.

The Chapter 720 Stormwater Management Code of the Cincinnati Municipal Code does not specifically reference green roofs but Section 12.4.4 of SMU's Rules and Regulations covers "rooftop storage" as an option for controlling stormwater runoff. SMU's proposed code revisions for *Post Construction Stormwater Management* also contains new green/vegetative roof criteria in section 4.6 Filter Post-Construction BMPs in parts 2.a.b.and c. This is consistent with Hamilton County SWD rules and regulations.

There are no explicit incentives related to the stormwater codes that would specifically allow a builder/developer to reduce their stormwater requirements based on green roof performance. The implicit incentive is reflected in the runoff coefficient used for the site. Pervious areas are assigned numbers that account for infiltration, and result in less "gray" infrastructure required on site.

MSDGC Rules & Regulations allow the use of green roofs to reduce effective impervious area of the development site; however, this is not yet reflected in current MSDGC rules and regulations and written guidance to builders and developers. At this time, the regulations do not allow green roofs to be used to meet stormwater detention requirements or CSO credits to be generated for flow reductions from green roofs (or other alternate stormwater controls) to the combined sewers. It should also be noted that MSDGC is partnered with OEPA and OEQ to provide low interest loans for green roof applications in the MSDGC service area.[7] The extent and use of the Green Loan program is unclear. It is MSD's intent to encourage green roofs and the reduction of CSO volume that green roofs could provide in combined sewer areas.

General Note: ODNR "Rainwater and Land Development" Manual has been adopted by Hamilton County Stormwater District (and SMU by virtue of membership in this district) as standards and specifications for stormwater BMPs. The proposed SMU Rules and Regulations will enable a more formalized set of standards for design, installation and operations & maintenance of BMPs.

Assessment of Current Condition

Code ordinance silent, but typically allowed

Priority Level: Low

Proposed Corrective Action:

- Review best practices codes and guidance documents from progressive municipalities/cities, as well as model codes being developed.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate.

[7] City of Cincinnati website: http://www.cincinnati-oh.gov/cmgr/pages/-38098-/

- Evaluate effectiveness and performance of green roof applications constructed to date through the Green Roof Loan Program and MSD's Green Infrastructure Demonstration Program.
- Note: Specific green roof construction standards should be addressed in the building code. Nationally, standards are being developed for green roofs in model codes.

Action Owner

SMU with MSD, City and County Building departments, and Hamilton County Stormwater

Timeframe for Resolution

12 - 24 month timeframe

A.2.b

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Rain Barrels and Cisterns

Current Situation

Generally, the current code does not disallow the use of rain barrels or cisterns; it only requires that the overflow from these systems be connected to the public sewer system. Downspout disconnection, as it relates to rain barrels and cistern implementation practices, is considered integral to building structures, so this issue is addressed in the Building Department's section of the municipal code. See Policy Gap B.2 of this report on the topic of Downspout Disconnection (page 32) for more information. The Hamilton County code allows the use of rain barrels or cisterns if properly installed; these County rules may also have a bearing on the majority of the MSD service area. Greater Cincinnati Water Works and the City Health Department also regulate the use of cisterns.

The current City stormwater codes do not directly address the use of rain barrels and cisterns for stormwater management. MSDGC allows the use of cisterns if it can be shown they will empty within 48 hours of the rain event; but the 48-hour requirement is only applicable if the features are going to be used to offset stormwater detention requirements. However, this may not yet be reflected in current MSDGC rules and regulations. Enforcement of connected downspouts in the city of Cincinnati is through the building department.

There is public interest in rain barrels and rain gardens with guidance are needed for homeowners, building owners, builders and developers. Rain barrels can often be installed by homeowners, but this presents a liability if done improperly. Making the "how-to" video guide MSD produced available via web could assist with public education to reduce improperly installed rain barrels and could encourage others to install rain barrels. Another opportunity would be a mechanism/system for MSDGC and/or SMU to track rain barrels (or other appropriate BMP technologies) to estimate impacts to CSO system. The system would have to incur minimal fees or no fees to ensure participation.

Assessment of Current Condition

Code ordinance silent, but typically allowed

Priority Level: Low

Proposed Corrective Action

- Confirm Building code language references any currently available standards and permits use of rain barrels and cisterns.
- Review best practices of model/progressive cities.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate.
- Continue to partner with Green Partnership for Greater Cincinnati (GPGC) on proactive applications of rain barrels and cisterns, including within the larger issue of rainwater harvesting and reuse. The GPGC project is engaging all of the affected code agencies and department on these issues. DRAFT white paper is being authored by this group and should be reviewed.

Action Owner

SMU, MSD, Hamilton County Storm Water District, City & County Building Departments and City & County Health Departments

Timeframe for Resolution

12 to 24 month timeframe

A.2.c

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Filter Strips/ Rain Gardens

Current Situation

- The existing stormwater codes, as well as building and zoning codes, do not specifically address the use of filter strips. However, "Special Fill Impounds" and "Infiltration Methods" are covered by Section 12.5 of the SMU Rules and Regulations. As well, Section 12.4.3 of SMU's Rules and Regulations addresses "storage trenches" under the heading of Tank Storage.
- The MSDGC regulations do not disallow their use if the site-specific application can be shown to provide stormwater detention benefits at the development site.

Assessment of Current Condition

Code/ordinance silent, but typically allowed. Filters are included in the draft Post-Construction chapter, proposed for addition to the SMU Rules and Regulations.

Priority Level: Low

Proposed Corrective Actions

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

12 to 24 month timeframe

A.2.d

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Bioinfiltration / Bioretention

Current Situation

- While the stormwater codes do not explicitly address the use of bioinfiltration or bioretention, Section 12.5 of the SMU rules and regulations generically covers allowable infiltration methods for controlling stormwater runoff.
- While MSDGC regulations do not specifically mention this technology, the use is allowed if the site-specific application can be shown to provide stormwater detention benefits at the development site.

Assessment of Current Condition

Code/ordinance silent, but typically allowed; desire to have consistent design specifications

Priority Level: High

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate. Review Green Demonstration Program for lessons learned.
- Incorporate into the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

3 to 6 month timeframe

A.2.e

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Detention Basins

Current Situation

Detention requirements on (re)development sites tributary to combined sewers are currently subject to Section 303 of MSD's rules and regulations, which requires stormwater detention for the 25-year, one hour event and allows the detention release rate to equal the pre-developed ten year, one hour event. The existing MSD detention requirements put heavy emphasis on the management of flow rates from development sites to predevelopment and/or original site conditions under a variety of design storms (2, 10, 25, and 100-year events). This does not provide significant reduction of CSO volume in average rain events. SMU detention requirements do not apply to sites tributary to combined sewers.

The MSD standards within the combined system for detention basins do not require the capture of small rainfall events such as the first inch of rain; capturing smaller storms in detention basins could be beneficial in reducing CSOs. Detention basins are a major technology used in current approaches and can often be modified to provide both 3/4 inch capture to reduce CSO flow in CSO areas and extreme event flooding risk mitigation.

It should also be noted that HCSWD requires water quality volume management – and there is an opportunity to apply this requirement to combined sewer system areas (not specifically provided for in the HCSWD rules) to impact CSO volume control. Proposed SMU code changes planned for spring 2012 will enable this smaller event management – but in separated areas only.

Assessment of Current Condition

Expressly required; desire to have consistent design specifications

Priority Level: High - NPDES

Proposed Corrective Action

- Consider if technical criteria allow for modification of detention basins to reduce CSO flows and average annual overflow volumes and maintain flooding risk protection. Explore revisions to provide for smaller event detention/flow management (SMU and MSDGC codes) in next 3-6 months.
- Develop concepts and technology definitions and best practices examples for CSO volume reduction in next 3-6 months.
- Incorporate into the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

Varied action timelines; near-term resolution in January 2012 with recommendations to the Council for proposed ordinance changes from SMU to meet NPDES requirements

A.2.f

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Berms and retentive grading

Current Situation

- The stormwater codes, as well as existing building and zoning codes, do not appear to address the use of berms and retentive grading. Berms are usually integral to the installation of a retention/detention basin. Therefore, parts of Chapter 12 of the SMU Rules and Regulations pertain to design requirements for berms, such as recommended slopes and embankment widths.
- The MSDGC regulations do not disallow their use if the site-specific application can be shown to provide stormwater detention benefits at the development site. However, MSD regulations for detention basins stipulate that if the berms or retentive grading is designed to hold water, it must drain down within 48 hours.

Assessment of Current Condition

Code/ordinance silent, but typically allowed

Priority Level: Low

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

12 to 24 month timeframe

A.2.g

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Swales

Current Situation

The stormwater codes, as well as existing building and zoning codes, do not appear to address the use of swales as features to retain/detain stormwater flow only as conveyance methods. SMU Rules and Regulations section 12.5.2 addresses infiltration trenches. Section 12.4.3 of SMU's Rules and Regulations addresses "storage trenches" under the heading of Tank Storage.

The MSDGC regulations do not disallow if the site-specific application can be shown to provide development stormwater detention benefits. As a conveyance application, the use of swales on private property is not regulated by MSDGC/SMU unless in a dedicated easement as part of the area public drainage system.

The broader challenge, or issue, is that current Subdivision Regulations practically mandate curbs and gutters for all public and private streets. So should the practice/technology be further allowed or encouraged by SMU/MSDGC, it would be important for the other impacted codes to be revised to support the practice during development/redevelopment as a post construction BMP for meeting PCSM requirements.

Assessment of Current Condition

Typically allowed

Priority Level: Low

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD, SMU, Hamilton County Storm Water District, CDOTE, Public Works

Timeframe for Resolution

12 to 24 month timeframe

A.2.h

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Constructed wetlands

Current Situation

The existing building and zoning codes do not appear to address the use of constructed wetlands. Under Chapter 12 of the SMU Rules and Regulations, wetlands would fall under the category of "wet ponds". Additional design guidance is provided by the ODNR "Rainwater and Land Development" Manual.

The MSDGC regulations do not disallow if the site-specific application can be shown to provide stormwater detention benefits. As a conveyance or water quality application, the use of constructed wetlands is not regulated by MSDGC. Recent City health code revisions further regulate native vegetation/noxious weeds/vector control/stagnant water, etc. Prior to these changes, these codes may have held back the installation of wetlands. Very few constructed wetlands have been implemented in the Greater Cincinnati area but the use is expected to increase as EPA stormwater permit requirements place more emphasis on stormwater treatment.

Assessment of Current Condition

Code/ordinance silent, but typically allowed

Priority Level: Low

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

12 to 24 month timeframe

A.2.i

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Ponds and wet basins

Current Situation

SMU currently permits "wet ponds/ wet retention" (Section 12.4.2 of SMU Rules & Regulations). Ponds must meet the requirements of "general sanitation" (Section 00053-13G of Municipal Code) to ensure proper drainage of the feature such that water does not stagnate or basins do not becoming a breeding ground for mosquitoes. For detention basins, SMU requires a minimum of 50 percent of the total storage volume required to attenuate the peak discharge of the facility to be recovered within a 24-hour time period. The remaining 50 percent shall be recovered within an additional 72-hour time period. This is inconsistent with Hamilton County's Stormwater Quality Management Regulations for Development and Redevelopment Projects (Section 510.F.7.a), which requires 100 percent drawdown of the WQv in 48 hours. SMU's proposed Post Construction Stormwater Management (PCSM) rules and regulations could correct this inconsistency by adopting the Hamilton County SWD standard.

Currently, MSD regulations do not disallow the use of ponds and wet basins, if the site-specific application can be shown to provide stormwater detention benefits.

Assessment of Current Condition

Expressly allowed; desire to have consistent design specifications

Priority Level: High

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples. Consult Consent Decree Green Infrastructure Demonstration Program Projects for lessons learned locally.
- Collaborate with Hamilton County on the development of design standards for best management practices. Participate in technical review of proposed standards. Adopt as appropriate. Assess applicability to Parks and other potential partners.
- Incorporate into the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County, and City/County Health Departments

Timeframe for Resolution:

3 to 6 month timeframe

A.2.j

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Subsurface infiltration

Current Situation

The Hamilton County Stormwater code seems to provide for infiltration technologies based on soil types. Section 12.5 of SMU's Rules and Regulations covers infiltration methods for stormwater runoff control. Neither stormwater utility has authority over combined sewer areas. Therefore, neither code has provisions allowing or encouraging CSO flow reductions that would facilitate MSDGC efforts.

MSDGC regulations do not disallow the use of subsurface infiltration; in fact, the Washington Park renovation, one of MSD's Consent Decree Green Infrastructure Demonstration Projects, included the construction of five drywells that infiltrate the majority of runoff from the park site.

Local subsurface infiltration applications can be challenging given Cincinnati's generally low infiltration type soils and high landslide potential. However, there are areas where soil types and conditions would permit use of infiltrators and in some cases, soils can be amended or contoured to enhance infiltration.

Assessment of Current Condition

Code/ordinance typically allows; desire to have consistent design specifications

Priority Level: Low

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples.
- Incorporate into the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

SMU with MSD and Hamilton County, Soil & Water Conservation District, Ohio State Cooperative Extension, Planning Department

Timeframe for Resolution

12 to 24 month timeframe

A.2.k

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Subsurface vaults

Current Situation

The existing MSDGC rules and regulations allow the use of subsurface vaults. They have been used on building sites when space has been limited primarily to meet peak-flow reduction requirements, not to reduce the volume of CSO's. For use in stormwater management, the benefits of the site-specific application must be shown. Section 12.4.3 of SMU's Rules and Regulations covers subsurface vaults under "tank storage."

Assessment of Current Condition

Expressly allowed

Priority Level: Low

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop specific guidelines for use of subsurface vaults for CSO volume reduction.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

3 to 6 month timeframe

A.2.1

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Porous pavement

Current Situation

Parking lots typically make up large areas of impervious cover that generate large volumes of stormwater runoff during rain events. Parking lot runoff from development/redevelopment sites are required to enter a detention/retention facility before being discharged to the public sewer system. Sites that do not have detention/retention systems have a burdensome effect on the public sewer system. Current parking code appears to allow for porous pavement applications that allow infiltration but assumes a high failure rate based on maintenance burden. Furthermore, porous pavement is only as effective as the propensity of soil underneath to infiltrate; otherwise, a secondary BMP will be necessary.

MSD rules and regulations do not disallow the use of porous pavement; however, the (re)developer must show that the site-specific application will provide stormwater detention benefits and ensure the feature's permanent maintenance plan.

It appears that while the use of porous pavement is permitted, it is not well defined how any credit or incentive for its use is handled. There is an opportunity to proactively use conventional parking lots/spaces for both onsite stormwater management and land cover (impervious area) management. There is an opportunity to determine how the use of porous pavement can be incentivized and CSO flow reduction credited.

Assessment of Current Condition

Expressly allowed

Priority Level: Med

Proposed Corrective Action

- Develop concept and technology definitions and best practices examples.
- Evaluate effectiveness and performance of porous pavement installations to date, including through MSD's Green Demonstration Program.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

3 to 6 month timeframe

A.2.m

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Prefabricated stormwater treatment units

Current Situation

The Hamilton County SWD regulations and the SMU proposed regulations both contain a section called "Alternative Post-Construction BMPs" which provide flexibility for new technologies such as prefabricated stormwater treatment units. MSD/Department of Industrial Waste sometimes requires treatment devices/prefabricated treatment units under certain circumstances.

There may be an opportunity for codes to provide more clarity on how new technologies (e.g. structural water quality applications) can be approved and tested and used by builders and developers. Some technologies have been permitted on a case-by-case basis. This particular form of sustainable infrastructure is evolving so flexibility in the code, rules and regulations is preferred.

Assessment of Current Condition

Code/ordinance typically allows

Priority Level: Low

Proposed Corrective Action

- Develop concept and technology definitions and best practices examples.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC efforts just getting started and is anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

6 to 12 month timeframe

A.2.n

Are the following best management practices (BMPs) for extended detention, extended conveyance and infiltration allowed and encouraged?

Inlet and outlet controls

Current Situation

In-line storage refers to a number of practices designed to use the storage within the storm drain system to detain flows. Current stormwater inlets are standardized and designed to meet peak flow requirements. While these practices can manage storm peak flows, they are limited in improving water quality and offering protection of downstream channels. SMU employs in-line storage at several locations. These systems were intended to relieve peak loading to the combined sewer system.

The CSO policy *Nine Minimum Controls* emphasizes maximizing in system storage and many cities are applying inlet/outlet controls to provide temporary storage on streets and public areas when it can be done without increasing flooding risks.[8] However, the EPA recommends combining in-line storage with other BMPs to treat water quality.[9] Use with other technologies such as "green streets" is becoming more common.

Assessment of Current Condition

Code/ordinance typically allows. Section 12.8 of SMU's Rules and Regulations expressly addresses "conduit storage as a structural control method."

Priority Level: Low

Proposed Corrective Action

- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

6 to 12 month timeframe

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[8] USEPA, "Combined Sewer Overflows, Guidance for Nine Minimum Controls", http://www.epa.gov/npdes/pubs/owm0030.pdf

[9] USEPA, "Menu of BMPS", Search keyword = "Inline Storage", http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

A.3
Are there standards and design metrics for the stormwater (extended detention, extended conveyance, and infiltration) best management practices (BMPs)?

Current Situation
The existing Rules and Regulations from MSD, SMU and Hamilton County Storm Water District all address some design standards for the most common BMPs such as detention basins, and some technologies related to infiltration, green roofs and porous pavement. To take this a step further, HCSWD is collaborating with MSD and SMU on a comprehensive Stormwater Design Manual that will contain local design standards and metrics for common stormwater best management practices as well as directions to applicable codes, rules and regulations, to create a practical "go-to" resource for local developers. This Design Manual should review lessons learned from MSD's Consent Decree Green Infrastructure Demonstration Projects to provide more localized and site specific guidance.

Generally, standards are deferred to ODNR Rainwater and Land Development Manual. This is a good resource but application and guidance is needed for maximizing use of alternative technologies for CSO volume reduction. For instance, a Stormwater Design Manual would help developers understand which BMPs are encouraged and how MSD/SMU/Hamilton County wants them to be constructed. It would also be an opportunity to clarify all of the different rules and regulations that pertain to each BMP.

Assessment of Current Condition
The ODNR Manual is currently deferred to; there is a desire to have local and consistent design specifications

Priority Level: High

Proposed Corrective Action
- Confirm SMU code language references any currently available standards.
- Develop concept and technology definitions and best practices examples. There is a need for Cincinnati/Hamilton County specific applicability and guidance.
- A process has already been initiated to collaborate with other Departments and Districts to develop draft standards and metrics. Streamline as appropriate to provide practical manual for developers, and achieve goals of the City's LDC efforts.

Action Owner
Hamilton County Storm Water District, MSD and SMU

Timeframe for Resolution
6-12 months

A.4

Do the current codes provide for any water quality management requirements for stormwater control measures (including treatment as well as pollution prevention)?

Current Situation

The existing SMU stormwater management code does not provide for significant water quality management requirements other than for gross pollutants. Gross pollutants generally consist of litter, debris, and coarse sediments. While these pollutants are not normally monitored in testing programs, many other pollutants of concern are bound to the gross pollutants. As a result, these pollutants degrade aquatic habitat, cause visual blight, smother productive sediments, leach harmful pollutants, and can cause unpleasant odors.[10] Newer products are constantly being designed and tested to trap and separate this trash from the runoff flow path before discharge. BMPs that treat gross pollutants are typically allowed and sometimes required.

In addition, the proposed SMU code changes will entail managing and treating the water quality volume (based on Hamilton County code) for the first ¾ inch of rain.

With the pending changes to the stormwater management requirements through NPDES MS4 regulations, this is an opportunity for SMU/MSD to create flexibility in the stormwater management code to be able to address more stringent stormwater quality treatment requirements. The Hamilton County Stormwater Code has adopted the model state code with a strong emphasis on sediment and erosion control. There is an opportunity to identify source control BMPs intended to not only treat but also prevent pollution – particularly in areas that are identified as higher risk land uses (parking lots, fueling areas, scrap yards). Applied in the combined sewer areas, the appropriate BMPs can achieve significant CSO volume reduction.

Assessment of Current Condition

Typically allowed, Industrial users must be registered with MSD/DIW and are inspected annually.

Priority Level: High - NPDES

Proposed Corrective Action

- Evaluate current and possible near future MS4 permit requirements and revise ordinances to allow SMU and MSDGC to be responsive and in compliance with those requirements.
- Review best practices of progressive municipalities/cities.
- Develop guidance for application in the CSS areas to reduce CSO volume.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

To be resolved with the January 2012 recommendations to the Council for proposed ordinance changes from SMU to meet NPDES requirements. The EPA's proposed revisions to the MS4 permit, which were said by the EPA to focus on more stringent water quality requirements for post construction, have not been released.

[10] Environmental Water Resources Institute, "ASCE GUIDELINE FOR MONITORING STORMWATER GROSS POLLUTANTS", http://www.stormwater.ucf.edu/conferences/9thstormwatercd/documents/ASCEguidelines.pdf

A.5
Do the current codes provide requirements and guidance for post construction stormwater management (in compliance with NPDES)?

Current Situation
The proposed City Municipal Code changes and the SMU Rules and Regulation revisions provide post construction standards, consistent with the already adopted Hamilton County Storm Water District Rules and Regulations, which meet current EPA NPDES MS4 requirements.

Assessment of Current Condition
Revisions to the SMU Rules and Regulations are required and have been drafted to meet PCSM NPDES requirements.

Priority Level: High : NPDES

Proposed Corrective Action
SMU/city recommended code changes should be adopted.

Action Owner
SMU with MSD and Hamilton County

Timeframe for Resolution
To be resolved with the January 2012 recommendations to the Council for proposed ordinance changes from SMU to meet NPDES requirements.

A.6
Do the current codes regulate/enforce illicit discharge detection and elimination (in compliance with NPDES)?

Current Situation
This regulation is a NPDES permit requirement and is already addressed as part of the MS4 permit requirements, but updating the City Municipal Codes is needed to achieve full compliance. SMU has already created proposed revisions to SMU's Rules and Regulations, based on Hamilton County Storm Water Districts Rules and Regulations, for addressing illicit discharge detection and elimination requirements. These proposed City Municipal Code changes, and SMU Rules and Regulation revisions, will only cover storm-only sewer systems. Illicit discharges to the combined/sanitary sewer system are already addressed through MSD's Department of Industrial Waste.

Assessment of Current Condition
SMU has submitted revised Municipal Code changes to the Director, who is in the process of submitting them to City Council for potential adoption in early 2012.

Priority Level: High - NPDES

Proposed Corrective Action
Adopt SMU proposed ordinance changes.

Action Owner
MSD with SMU and Hamilton County

Timeframe for Resolution
To be resolved with the January 2012 recommendations to the Council for proposed ordinance changes from SMU to meet NPDES requirements.

B.1

Do the current MSD rules and regulations provide for the limitation of stormwater flows into the combined sewers from the development site to predevelopment levels (or less) for flow rate and volume?

Current Situation

MSD rules and regulations do require detention to predevelopment levels in the combined sewer areas - specifically Section 303 of MSD's rules and regulations requires stormwater detention for the 25-year, one hour event and allows the detention release rate to equal the pre-development ten year, one hour event. This pertains to a development/disturbance of 10,000 square feet or more. Although not specifically stated in the rules and regulations, MSD does require either stormwater management to pre-development levels or a site composite impervious area coefficient of 0.45, whichever is more stringent.

There is an opportunity to enhance the MSDGC rules and regulations to more fully support flow and volume management by current CSO credit system. It would also be an opportunity to reflect current practice in the rules and regulation. Currently there are processes and guidance that is not explicitly stated in the current rules and regulations that need to be written clearly into the updated Rules and Regulations. MSDGC flow management requirements are different from SMU's – MSDGC's are more stringent applied to peak flow reduction but ineffective in reducing CSO volume.

Assessment of Current Condition

Required by current MSD Rules and Regulations but could be improved to reduce CSO volume

Priority Level: High

Proposed Corrective Action

- Review existing MSD rules and regulations to identify opportunities to enhance requirements for stormwater flow management to the combined sewers, e.g. volume (and smaller event) management to help reduce CSO volume.
- Review best practices codes of progressive municipalities/cities and model codes being developed.

Action Owner

MSD

Timeframe for Resolution

3 to 6 month timeframe

B.2

Do the current codes allow the disconnection of downspouts when such disconnection will not cause a public nuisance and a suitable alternative stormwater outlet is available?

Current Situation

While Hamilton County allows the disconnection of downspouts, the City of Cincinnati does not – however, the rules do allow for exemptions. Currently downspouts are required to be directed into the public sewer system. Disconnecting downspouts and routing to rain barrels, cisterns, rain gardens, and infiltration drains reduces flow of the cleanest runoff into the CSS allowing the treatment facility to be reserved for more concentrated wet weather flows. Proposed revisions to the building code provides for individual downspouts to be removed from any system when they are evaluated and determined not to contribute to a public nuisance.

Incentives to disconnect downspouts from the public sewer system have been evaluated previously in some MSDGC Consent Decree Green Infrastructure Demonstration Project areas. Some communities have developed incentive programs and in order for this to be successful in Cincinnati, these approaches should be considered as part of a new program or incentive. Area specific considerations should be considered, e.g. hillside districts should not allow downspout disconnection due to the high propensity to slippage/landslides. Some cities are providing alternative discharge options into stormwater BMP's (green street type BMP's) facilitating the disconnection. It will be important for program effectiveness if the public side issues are addressed to provide alternative (to combined sewers) outfalls for downspout flows.

Assessment of Current Condition

Currently prohibited by Code/ordinance, proposed ordinance would allow under approved circumstances

Priority Level: High

Proposed Corrective Action

- Review best practices codes of municipalities/cities and model codes being developed.
- Clarify with Building Code, etc. what is permissible/allowable under current code.
- Review proposed ordinances and existing MSD Stormwater Removal Program (downspout disconnections, etc.) guidance for opportunities to provide more specific guidance.

Action Owner

MSD, Buildings Department, CDOTE (geotechnical division)

Timeframe for Resolution

Although not an NPDES requirement, this item is to be resolved simultaneously with the January 2012 recommendations to the Council for proposed ordinance changes from SMU to meet NPDES requirements.

B.3

Do the current codes provide for an incentive program for the use of Green Infrastructure (GI) or Low Impact Development (LID) controls, for example an offset credit policy in development and redevelopment activities?

Current Situation

The current Section 514 of Article V of the MSD Rules & Regulations allows development projects to create sewer credits; reimbursement for extra sewer work by developers including projects which have created sewer credits; and the potential for stormwater controls/improvements to generate offset credits. This last provision is pending EPA approval for implementation, however. In the interim, DRAFT technical guidelines have been prepared by MSD on how to generate offset credits with stormwater controls. Other non-regulatory barriers to implementation of an credit program for GI/LID controls is the need for long-term maintenance agreements, and better understanding of the impacts on property value.

The Hamilton County SWD rules and regulations and SMU proposed PCSM rules and regulations have a similar section called "Offsite alternatives and Alternative Actions". This section allows the acquisition or conservation easements of open space contributing to stormwater controls to count as a post construction BMP.

Assessment of Current Condition

Expressly allowed

Priority Level: Med - Low

Proposed Corrective Action

- Collaborate with EPA on pilot opportunities for an off-set credit program to include LID controls.
- Revisit DRAFT regulations prepared by MSD and review for opportunities to enhance the incentives/policy.

Action Owner

MSD with SMU and Hamilton County

Timeframe for Resolution

3 to 6 month timeframe

Topic Question

Do the current building and plumbing codes support in general LEED and other "green building" recommended practices and designs, especially those related to stormwater and rainwater reuse?

C.1

Is there a plan to prevent loss of soil during construction from stormwater runoff and to prevent sedimentation in storm sewers, combined sewers and receiving streams?

Current Situation

Erosion and sediment control measures are a requirement of the NPDES permit. Cincinnati's Municipal Building Code addresses this issue, but the current regulations are difficult to enforce. Draft regulations have been prepared by SMU adopting the Hamilton county requirements that require more detailed site planning and construction standards and fines for violations.

General Note: *Through the LEED-CRA Green Commercial Tax Abatement, the City offers a property tax abatement for projects achieving LEED certification – 75% abatement is offered for qualified new construction or renovation.*

Assessment of Current Condition

Required by current code ordinance

Priority Level: High - NPDES

Proposed Corrective Action

Adopt proposed code changes drafted by SMU

Action Owner

SMU, Building Department and MSD

Timeframe for Resolution

To be resolved with the January 2012 recommendations to the Council for proposed ordinance changes from SMU to meet NPDES requirements.

Topic Question

Do the current building and plumbing codes support in general LEED and other "green building" recommended practices and designs, especially those related to stormwater and rainwater reuse?

C.2.a

Are the following specific LEED criteria allowed, supported or included in building permit/site construction codes:

Use and standards for Green Roofs

Current Situation

SMU covers "rooftop storage" for stormwater runoff in section 12.4.4 of the rules and regulations. The City and State Building Codes do not disallow green roofs. However, the Hamilton County Stormwater District's Stormwater Design Manual could provide more detailed design standards and links to applicable codes.

Locally there are a number of programs that encourage the use of green roofs, although their success has been limited. The Green Roof Loan Program, which was created, by OEPA, MSDGC and OEQ, provides low interest loans to install green vegetative roofs within the MSDGC service area.

Assessment of Current Condition

Expressly allowed

Priority Level: Low

Proposed Corrective Action

- Evaluate effectiveness of Green Roof Loan Program, and other MSDGC projects utilizing the green roof technologies. Develop recommendations for enhancement. Review best practices examples.
- Collaborate with US Green Building Council
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

City & County Building Departments with MSD, SMU, Hamilton County

Timeframe for Resolution

6 to 12 month timeframe

Topic Question

Do the current building and plumbing codes support in general LEED and other "green building" recommended practices and designs, especially those related to stormwater and rainwater reuse?

C.2.b

Are the following specific LEED criteria allowed, supported or included in building permit/site construction codes:

Water Use Reduction (e.g. minimum requirement of 20% up to 50% from baseline conditions) inside buildings using high efficiency fixtures, waterless urinals and stormwater reuse for flushing toilets

Current Situation

Currently there are several barriers to the internal building use of harvested rainwater in Cincinnati, namely current codes for Department of Health, Greater Cincinnati Water Works, and Building/Plumbing. Although GCWW has no objections to collecting rainwater for irrigation, there are concerns about introducing non-potable water into structures that are, or can be, served by GCWW's potable water system; these concerns are also expressed at the state level under the Ohio EPA Drinking Water program. These concerns are based on a general *absence* of accepted standards for the design, permitting, inspection, testing, operation, and maintenance of non-potable water systems within structures. Without these standards, the integrity of the potable water system could be compromised through cross contamination. Although there appears to be challenges that may prevent the capture and use of rainwater, GCWW has expressed interest in working cooperatively to find solutions and to develop appropriate standards that benefit all interested parties without compromising the health and safety of the general public while maintaining the integrity of the public water system.

These issues are also being evaluated and investigated through the Green Partnership for Greater Cincinnati. Tools such as special exemptions and long term maintenance agreements may need to be explored further.

Assessment of Current Condition

Code/ordinance silent, but not typically allowed

Priority Level: Low

Proposed Corrective Action

- Partner with GPGC to advance this issue. Review DRAFT White Paper to be drafted by GPGC, which has a funded project to facilitate the key players in addressing this issue.
- Review case studies of successful applications in North America.
- Further evaluate current building/plumbing code for implementation opportunities.

Action Owner

Building Department, GCWW and Health Department, as well as any impacted county/state agencies such as OEPA

Timeframe for Resolution

6 to 12 month timeframe

Topic Question

Do the current building and plumbing codes support in general LEED and other "green building" recommended practices and designs, especially those related to stormwater and rainwater reuse?

C.2.c

Are the following specific LEED criteria allowed, supported or included in building permit/site construction codes:

Use of any or all of the following for watering/irrigation of on-site landscaping and water features: harvested stormwater, recycled grey waters, A/C condensate

Current Situation

The current codes appear to allow the external use (e.g. irrigation) of harvested rain water. Opportunities to encourage rainwater reuse should be further explored. These issues are being more thoroughly evaluated and investigated through the Green Partnership for Greater Cincinnati.

Assessment of Current Condition

Code/ordinance silent, but typically allowed

Priority Level: Low

Proposed Corrective Action

- Partner with GPGC to advance this issue. Review DRAFT White Paper to be drafted by GPGC, which has a funded project to facilitate the key players in addressing this issue.
- Review case studies of successful applications in North America.

Action Owner

Building Department, Health Department, Cincinnati Water Works, Ohio EPA as well as any impacted county agencies

Timeframe for Resolution

6 to 12 month timeframe

C.3
Do the current codes regulate/enforce earthwork (erosion & sediment control) activities (in compliance with NPDES)?

Current Situation
The City Municipal Code, Title XI – Building Code, Chapter 1113 – Excavation or Filling of Land, regulates sediment and erosion control, but has been difficult to enforce within the current framework.

Draft ordinances have been prepared by SMU to strengthen the sediment and erosion control section of the Cincinnati Municipal Code to allow the Building Department to enforce any sediment and erosion control, and SMU to enforce any illicit discharge issues that adversely affect the municipal separated storm sewer system (MS4). SMU has also drafted a Sediment and Erosion Control Rules and Regulations chapter, consistent with the Hamilton County Storm Water District Rules and Regulations, to provide technical guidance for site planning and proper implementation of sediment and erosion control BMPs. These regulations would apply to CSS areas as well as separated areas in the MSD service area.

Assessment of Current Condition
Current regulations are inadequate for enforcement of NPDES permit requirements

Priority Level: High: NPDES

Proposed Corrective Action
- Develop concept and technology definitions and best practices examples.
- Incorporate into the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just being started, and anticipated to be complete in 2014.

Action Owner
Building Department with MSD and SMU

Timeframe for Resolution
To be resolved with the January 2012 recommendations to the Council for proposed ordinance changes from SMU to meet NPDES requirements.

Topic Question

Do the current development codes encourage and support watershed planning and sustainable sites design – to not only enable stormwater management (e.g. reduction of impervious area from parking, streets and roads, roofs and other paved surfaces) but also CSO volume control and water quality management?

D.1

Do the current codes provide for low impact development, light imprint and concepts such as conservation development and enhanced hillside districts?

Current Situation

The current codes do not appear to specifically address sustainable sites design or watershed-based development and planning. However, there may be programs that provide separate incentives – for example, per Section 1403.11-Cluster Housing, there is a bonus program for Cluster Development as an incentive for developers/landowners to conserve non-regulated land (open space). Cincinnati also has a hillside protection ordinance that restricts or limits development in landslide susceptible areas.

Assessment of Current Condition

Expressly allowed

Priority Level: Low

Proposed Corrective Action

- Develop concepts and technology definitions and best practices examples.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

Planning and Zoning Department, with MSD and SMU, as well as any impacted county agencies

Timeframe for Resolution

City's LDC timeframe

D.2

Do the current codes allow the proactive use of conventional parking lots/spaces for onsite stormwater management and land cover management?

Current Situation

Parking lots are a significant impervious area in most urban watersheds that could possibly be converted with alternative stormwater technologies to reduce stormwater flow and especially capture the first ¾ to 1 inch of rain to reduce CSO flows. Private parking lots are currently permitted to be used for stormwater detention purposes. See Chapter 12 of SMU's Rules and Regulations and see City Municipal Code: Chapter 1423 – Landscaping and Buffer Yards.

Parking lot regulations are based on minimums (i.e. requirements that you must have at least X parking spaces as a minimum) but could be enhanced for stormwater management by adding a maximum or median requirement and allow parking reductions through more progressive parking policies. It also appears that bio-infiltration is an acceptable measure for meeting landscape requirements in the parking code.

Assessment of Current Condition

Code/ordinance silent, but typically allowed

Priority Level: Medium

Proposed Corrective Action

- Identify other opportunities to enhance the existing codes in being more explicit about accepted practices and providing clarity and guidance.
- Review case studies/best parking practices.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner

City Transportation, Planning and Zoning Department, with MSD and SMU, as well as any other impacted county agencies

Timeframe for Resolution

City's LDC timeframe

D.3
Do the current codes provide for the use/design of green streets?

Current Situation
The existing codes do not appear to disallow the use of green streets for stormwater management. The City's Green Streets Demonstration Project has already produced design examples for urban areas from facilitated partnerships with key agencies (i.e. the Cincinnati Water Works along Spring Grove Avenue) and the community.

Green Streets typically use porous surface materials and vegetated facilities to manage stormwater runoff close to the source and depending on site conditions, can effectively manage the necessary water quality volume and increase urban tree canopy. These facilities can also be a good approach for redirecting flows from disconnected downspouts and from curb cuts in streets. Competition for limited street right-of-way, compacted soil conditions and lack of funding are the main restricting factors for green street implementation. In dense urbanized areas, green street retrofits should be given high priority when considering alternative source control options.

Assessment of Current Condition
Code/ordinance silent, but typically allowed

Priority Level: High

Proposed Corrective Action
- Review best practices codes of progressive municipalities/cities and model codes being developed.
- Prepare list of projects (ESP, GDP, CDOTE/Green Streets/Alleys, etc) to generate lessons learned.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just getting started, and anticipated to be complete in 2014.

Action Owner
City Transportation, City Planning and Zoning Department, with MSD and SMU, as well as any other impacted city and county agencies

Timeframe for Resolution
City's LDC timeframe

D.4

Do the current codes regulate stream/riparian corridor protection zone to restrict the intensity and/or use of land, for drainage areas of 100 acres or more (in compliance with NPDES)?

Current Situation

This is another requirement of the NPDES permit, in which a Riparian Corridor Protection zone is established to restrict the intensity and/or use of land with drainage areas of 100 acres or more. The County code is viewed as the standard, but is not in alignment with what the City can enforce, e.g. buried streams and highly development channel corridors. The City Municipal Code: Chapter 1415 – Riverfront Districts does include a required 50-foot riparian buffer but this only applies in areas zoned to "riverfront district". There is also a floodplain development permit, see City Municipal Code: Chapter 1109 – Flood Damage Reduction, which potentially limits development in flood prone areas.

DRAFT regulations have been tabled by SMU for the time being, in order to allow further discussion and resolution on this regulation and the impacts on the existing highly developed corridors in the City. In the meantime, the use of an development control (IDC) is being explored with Planning as a reasonable exemption to the County code. The City's LDC effort would be a good opportunity to address this issue long term.

Assessment of Current Condition

Code/ordinance silent, but typically allowed

Priority Level: Medium – NPDES

High – Development Control

Proposed Corrective Action

- Identify and discuss conflicts with the County code.
- Participate in discussion/workshops with stakeholders on developing a regulation appropriate for Cincinnati areas, such that the use and effectiveness of stream/riparian corridors is best served.
- Participate in the City's Land Development Code (LDC) effort - for which Lick Run is a Pilot Study Area – to address this item within the broader context of watershed-based or sustainable site design standards. The LDC effort is just being started, and anticipated to be complete in 2014.

Action Owner

Planning and Zoning Department, with MSD and SMU

Timeframe for Resolution

City's LDC timeframe

Topic Question

Do codes require or support landscaping with native plants, tree planting with recommended species for urban forests, preservation of greenspace and limitations on building and parking footprints?

E.1

Do current codes allow the use of native plants, for use in stormwater management features such as rain gardens?

Current Situation

Current Health department codes now (adopted June 2011) incorporate standards for the use of native vegetation on property. In collaboration with Cincinnati Parks, groups of native vegetation types were re-classified as non-noxious weeds to allow for managed natural landscaping, thus impacting the use in stormwater management features such as rain gardens. The Weed Ordinance, Section 731 of the Municipal Code, was revised to Natural Managed Areas.

Assessment of Current Condition

Expressly allowed

Priority Level: Low

Proposed Corrective Action

To be determined

Action Owner

Health Department, Planning and Zoning, Parks

Timeframe for Resolution

City's LDC timeframe

E.2
Do current codes provide for the installation of street trees to increase the tree canopy over impervious areas, i.e. urban tree canopy?

Current Situation
The current codes do not adequately address the use of urban tree canopy installations or the protection/preservation of existing trees. Cincinnati Parks has an urban forestry program that encourages, builds and maintains trees in ROW. The CDOTE Manual for Design of Private Streets or Developments (1996), states that private streets must be tree-lined (p.37), but not sure if this is enforced. According to a stormwater workshop participant, CDOTE was working on a new set of Subdivision Regulations in 2010 but the final status of this is unknown.

Tree plantings need to be coordinated with locations of sewers and laterals because they can cause significant damage to underground facilities that can cause sewer backups in buildings. SMU's Rules and Regulations, section 2.13, requires new tree plantings to be at least 15 feet away from public storm structures. Urban Forestry requires trees to be at least 10 feet away from manholes and inlets.

City Parking Code, Chapter 1425-29 Parking Lot Landscaping Requirements, states, "One tree, two inches or more in caliper, must be planted for every ten parking spaces."

Many US cities are adopting goals for urban tree canopy use, and leverage volunteer efforts to focus on increased planting of street trees to increase canopy over impervious areas.

Assessment of Current Condition
Required by current code ordinance

Priority Level: Low

Proposed Corrective Action
Review best practices from other cities.

Action Owner
City Transportation, Parks, Urban Forestry, and others

Timeframe for Resolution
City's LDC timeframe