



# Certified Recommendation

Raleigh Planning Commission

CR#11791

## Case Information: TC-4-17 / Text Changes for Advancing Green Infrastructure and Low Impact Development in Raleigh

### Comprehensive Plan Guidance

<i>Applicable Policy Statements</i>	<p><b>Policy EP 2.1: Green Infrastructure</b> Ensure protection of Raleigh’s unique and significant green infrastructure – its natural resources, landscapes, and ecological systems – through best practices management stewardship and land use regulations.</p> <p><b>Policy EP 3.1: Water Quality BMPs</b> Use non-structural best management practices (BMPs) in an effort to improve water quality, such as public education programs, monitoring and control of illicit discharges, expansion of the greenway concept to include “receiving lands” that can absorb storm surge overflows, and update of the City’s sediment control program with an orientation toward performance measures.</p> <p><b>Policy EP 3.4: Low Impact Systems for Parking</b> Well maintained pervious pavement or other low impact systems for parking areas should be encouraged throughout the City, especially in environmentally sensitive areas and floodplains, as appropriate.</p> <p><b>Policy EP 3.8: Low Impact Development</b> Promote the use of LID techniques to mitigate the impact of stormwater runoff. This includes the use of green roofs, rain gardens, cisterns, rain barrels, and on-site wastewater reuse systems in urban and suburban landscapes.</p> <p><b>Policy PU 5.1: Sustainable Stormwater Management</b> Reduce run-off velocity and improve water quality from existing and new development using sustainable infrastructure techniques that use soils and vegetation to capture, cleanse, and re-use stormwater runoff.</p> <p><b>Policy PU 5.4: Discharge Control Methods</b> Apply discharge control methods that control both peak and volume and that are economically, aesthetically, and environmentally acceptable as well as effective in stormwater management.</p> <p><b>Policy PU 5.5: Stormwater Education</b> Educate and involve the public in stormwater management.</p> <p><b>Policy PU 5.6: Rainwater Collection and Storage</b> Where adjacent waters are not vulnerable to even minor reductions in base flow, encourage the deployment and use of rainwater collection and storage systems such as rain barrels and cisterns and rain gardens by residential and commercial property owners and managers.</p> <p><b>Policy T 1.5: Context Sensitive Road Design</b> “Context sensitive” approaches shall be used for new roadways or widening of existing roads to minimize impacts to historic business districts and neighborhoods and sensitive natural areas (particularly in watershed protection, conservation management and metro park protection areas).</p>
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## **Policy T 6.9: Green Parking Facilities**

Reduce stormwater runoff generated by parking facilities by promoting an increase in the use of tree planting and landscaping, green roofs for parking decks, and permeable materials for parking lots, driveways, and walkways.

### **Narrative excerpts from Environmental Protection Element**

Adoption, implementation, and enforcement of this Environmental Protection Element presents the City of Raleigh with an opportunity to move toward more comprehensive solutions to complex environmental problems.

Part of Raleigh's natural landscape includes the Neuse River, identified by American Rivers as the eighth most endangered river in the US. As a capital city and as a community at the headwaters of the Neuse, Raleigh is uniquely positioned to champion the recovery of this degraded resource. Looking beyond the river, and at the watershed as a whole, both water quality and water quantity will play significant roles in the City's ability to meet the needs of its growing population.

The City of Raleigh has a responsibility to current residents and future generations to immediately improve the health of local rivers, creeks, floodplains, and wetlands, and to continue to protect these resources for the long term. These elements of the City's green infrastructure cannot continue to be compromised, as they represent a direct lifeline to the vitality of the City as a whole: without ample, clean water resources, the City of Raleigh cannot survive long-term droughts, much less thrive with current and projected levels of population. The core goals to be fulfilled by these water quality and conservation policies include: keeping rainfall on-site as much as possible, thereby mimicking the flow of water in a natural setting and reducing non-point source pollution from stormwater run-off; increasing water conservation measures, and reducing overall demand for water; minimizing soil erosion and sedimentation; reducing flood damage; and reducing nutrient loads.

### **Narrative excerpts from Stormwater Public Utility Element**

Runoff degrades the environment and imposes costs on downstream communities and the public sector. Ongoing improvements to the City's stormwater infrastructure, programs, and regulations will be directed to improving the overall health of urban watersheds. Through sustainable practices that protect water quality, enhance fish and wildlife habitat, and provide for urban green spaces an improved quality of life will be realized.



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<p><i>Applicable Action Items</i></p>	<p><b>Action EP 3.1: Demonstration Projects</b>            Work with other City departments, regional partners, and the local development community to promote demonstration projects within the City of Raleigh that use multiple water conservation measures on single sites. Incorporate Best Management Practices (BMPs) such as green roofs, bioretention cells, permeable pavers, large- and small-scale rainwater harvesting, innovative wastewater treatment and re-use systems, and grey water. Offer incentives, such as grants, fee waivers, tax breaks, and/or density bonus or transfer provisions for participating in demonstration programs.</p> <p><b>Action EP 3.2: Low Impact Development Ordinance</b>            Develop and adopt an incentive-based LID ordinance so that rainwater is retained and absorbed on-site as an alternative to traditional approaches that include piping, channelization, and regional detention.</p> <p><b>Action EP 3.4: Water Quality Management Projects</b>            Identify and retrofit specific sites in the City of Raleigh where water quality management projects can be installed in existing developments.</p> <p><b>Action PU 5.4: Green Infrastructure Study</b>            Undertake a green infrastructure study that identifies landscapes where stormwater can be absorbed naturally. Model both watersheds and sub-watersheds for the amount of green infrastructure that is present to perform this function.</p> <p><b>Action T 1.3: Context Sensitive Solutions</b>            Adopt context sensitive solution practices to determine the most appropriate transportation improvements to minimize environmental impacts and serve adjacent and future land uses within a multi-modal network. These practices should be included in a revision to the Streets, Sidewalks, and Driveway Access Handbook.</p>
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## Summary of Text Changes

<p><i>Summary</i></p>	<p>These text changes would amend various UDO sections in Chapters 1, 2, 7, 8, 9, and 12. Refer to specific UDO text changes given in the accompanying table titled Recommended Text Changes for Advancing Green Infrastructure and Low Impact Development in Raleigh.</p> <p>In general, the majority of these text changes would provide options to developers and their designers for managing stormwater runoff in ways that reduce runoff volume and remove pollutants by using existing natural features or by constructing features that mimic nature. These text changes would achieve one or more of the following for design of stormwater-related aspects of site development:</p> <ul style="list-style-type: none"> <li>• Explicitly allow, but not require, use of green stormwater infrastructure (GSI) practices (rather than the status quo of passively allowing GSI practices by not prohibiting them);</li> <li>• Allow flexibility in selecting landscaping plant species (types, numbers, and</li> </ul>
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	<p>placement) to support use of GSI practices;</p> <ul style="list-style-type: none"> <li>• Remove or provide flexibility with current requirements that are unnecessary, overly prescriptive, or conflict with use of GSI practices; and/or</li> <li>• Expand the types of allowable measures for meeting the City's requirements for control of stormwater runoff.</li> </ul> <p>Two of the recommended text changes in Chapter 9 would be new requirements for site development. Both would amend relatively narrow provisions for the Falls and Swift Creek Watershed Protection Overlay Districts:</p> <ul style="list-style-type: none"> <li>• Certain development lots would be subject to a limit on "buildable area" (a proposed new term defined in these text changes), rather than on "impervious surface area". These text changes are in response to concerns expressed by City Council members that use of GSI practices in water supply watersheds could result in more intensive site development than intended by the protections currently afforded by the UDO.</li> <li>• Certain developments would be required to use GSI practices, rather than conventional stormwater control practices, unless the cost of GSI practices is more than 1.25 times the next best alternative stormwater design that meets City requirements. This change would apply to streets where impervious surface coverage is greater than prescribed thresholds and to developments in a secondary water supply watershed protection area where buildable area exceeds a prescribed threshold. These text changes are intended to advance the use of GSI practices generally and to increase protection of these water supplies from export of pollutants from developed sites.</li> </ul> <p>Refer to the History/Overview section of the accompanying Zoning Staff Report.</p>
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### Summary of Impacts

<i>Impacts Identified</i>	<p><u>Adoption of TC-4-17:</u></p> <p>1) Adoption of these text changes would help advance the use of GSI practices in Raleigh. Applied broadly, use of GSI practices will reduce erosion, scouring, and degradation of streams by reducing rates and volumes of stormwater runoff from development sites and by reducing amounts of pollutants carried to streams by runoff. Refer to benefits associated with each text change given in the accompanying table titled Recommended Text Changes for Advancing Green Infrastructure and Low Impact Development in Raleigh.</p> <p><u>No Action:</u></p> <p>1) The City's objectives for advancing GI/LID in Raleigh would not be realized or would be realized only slowly.</p>
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### Public Meetings

<i>Submitted</i>		<i>Committee</i>	<i>Planning Commission</i>	
6-9-2017	6-14-2017	Text Review Committee Work Session	7-11-2017	Planning Commission

Attachments

1. Table titled Recommended Text Changes for Advancing Green Infrastructure and Low Impact Development in Raleigh

### Planning Commission Recommendation

<i>Recommendation</i>	Text Committee to report TC-4-17 out to Planning Commission with a positive recommendation. At the July 11, 2017 Commission meeting, Commissioner Adam Terando moved and Rodney 2 <sup>nd</sup> a motion make a modification to the text amendment to remove the limitations on parking within the text amendment. The vote on this modification was 7-0.
<i>Findings &amp; Reasons</i>	The Text Committee found that the need for these text amendments were consistent with the goals and action strategies of the 2030 Comprehensive Plan.
<i>Motion and Vote</i>	Joe Lyle moved and Eric Braun seconded a motion to forward this the July 11, Planning Commission meeting with a positive recommendation. At the July 11, 2017 Commission meeting, Commissioner Adam Terando moved and Rodney 2 <sup>nd</sup> a motion to forward this text amendment to the City Council with a positive recommendation. The vote was 7-0.

This document is a true and accurate statement of the findings and recommendations of the Planning Commission. Approval of this document incorporates all of the findings of the attached Staff Report.

\_\_\_\_\_  
Planning Director

\_\_\_\_\_  
Date

\_\_\_\_\_  
Planning Commission Chairperson

\_\_\_\_\_  
Date

Staff Coordinator:

Eric Hodge: [eric.hodge@raleighnc.gov](mailto:eric.hodge@raleighnc.gov)



## Zoning Staff Report – TC-4-17

### Text Changes for Advancing Green Infrastructure and Low Impact Development in Raleigh

#### Request

<i>Section References</i>	Various UDO sections in Chapters 1, 2, 7, 8, 9, and 12. Refer to specific UDO sections given in the accompanying table titled Recommended Text Changes for Advancing Green Infrastructure and Low Impact Development in Raleigh.
<i>Basic Information</i>	Refer to Summary of Text Changes in the accompanying Certified Recommendation.
<i>PC Recommendation Deadline</i>	July 11, 2017

#### Comprehensive Plan Guidance

<i>Applicable Policies</i>	Refer to items listed in the accompanying Certified Recommendation.
<i>Action Items</i>	Refer to items listed in the accompanying Certified Recommendation.

#### Contact Information

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#### History/Overview

At City Council work sessions in May and October 2016, staff provided updates on the implementation of the GI/LID Work Plan that the City Council approved in March 2015. Those updates provided information on the work of the two parallel stakeholder work groups and various other focus groups to address the work plan's priority items. These work groups completed their efforts in March 2016, and their recommendations are summarized in a staff memorandum to the City Council dated May 4, 2016. Details of the work groups' efforts can be found in materials provided to Council Members during the May work session, including the Implementation Work Group Report, the Code Review Work Group Report, the May 4 summary memo, and GI/LID Fact

Sheets that demonstrate use of these techniques within various development types. On December 6, 2016, Council authorized staff to prepare the UDO text changes for the Planning Commission's consideration.

Among other recommendations, the work groups and staff recommended making a number of text changes to the UDO, other ordinances, and associated manuals and handbooks for reducing real and perceived impediments to the use of GI/LID practices. For projects that incorporate GI/LID practices, these text changes and policy adjustments are intended to improve definition of practices that are and are not allowed and to make more predictable the processes and timelines for completing development plan reviews and obtaining permits.

In addition to these UDO text changes, other ordinances and design handbooks will be adjusted to remain consistent with the amended UDO.

## **Purpose and Need**

Refer to Summary of Text Changes in the accompanying Certified Recommendation.

## **Alternatives Considered**

None

## **Scoping of Impacts**

Potential adverse impacts of the proposed text change have been identified as follows:

None.

The adverse impacts of taking no action (retaining the existing regulations) have been identified as follows:

The City's objectives for advancing GI/LID in Raleigh would not be realized or would be or would be realized only slowly.

## **Impacts Summary**

### **Adoption of Proposed Text Change**

Adoption of these text changes would help advance the use of GSI practices in Raleigh. Applied broadly, use of GSI practices will reduce erosion, scouring, and degradation of streams by reducing rates and volumes of stormwater runoff from development sites and by reducing amounts of pollutants carried to streams by runoff.

### **No action**

The City's objectives for advancing GI/LID in Raleigh would not be realized or would be or would be realized only slowly.

**ORDINANCE NO. 2017 – 740 TC 398**

**TC-4-17**

**AN ORDINANCE TO AMEND CHAPTERS 1, 2, 7, 8, 9, AND 12 OF THE RALEIGH UNIFIED DEVELOPMENT ORDINANCE TO INCORPORATE PROVISIONS FOR ADVANCING GREEN INFRASTRUCTURE AND LOW IMPACT DEVELOPMENT IN RALEIGH**

**WHEREAS**, the main sources of pollutants and damaging flows that degrade Raleigh’s local streams are stormwater runoff from impervious surfaces of developed land and activities conducted on developed land;

**WHEREAS**, the City of Raleigh, through its Strategic Plan, its 2030 Comprehensive Plan, and associated policies, ordinances, and resolutions, expresses its commitment to improving the health of local streams and lakes and of the Neuse River by promoting use of green infrastructure and low impact development;

**WHEREAS**, the Raleigh City Council and the Stormwater Management Advisory Commission have encouraged review of the City code and City policies and practices for opportunities to identify aspects that tend to impede or discourage developers’ and designers’ incorporation of green infrastructure and low impact development practices in their designs for new development and redevelopment; and

**WHEREAS**, the City of Raleigh has determined that revisions to its Unified Development Ordinance are desirable for advancing the use of green infrastructure and low impact development in Raleigh.

**NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF RALEIGH THAT:**

**Section 1.** Section 1.5.3.C.7. of the Raleigh Unified Development Ordinance, Measurement, Exceptions & General Rules of Applicability; Coverage; General Requirements, is hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

7. ~~Above-ground stormwater detention facilities~~ Stormwater detention wet ponds and dry ponds shall not be considered an outdoor amenity area. GSI practices may be used to meet up to 10% of the requirement for the amenity area.

**Section 2.** Section 1.5.3.D.2. of the Raleigh Unified Development Ordinance, Measurement, Exceptions & General Rules of Applicability; Additional Requirements for Urban Plazas, is

hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

2. Amenity areas ~~may~~ shall contain ~~any~~ at least one of the following: benches, seats, tables, eating areas, plazas, courtyards, fountains, active recreation areas, or public art. In addition, vegetated GSI practices may be located within the amenity area and may be used to meet up to 10% of the requirement for the amenity area. Stormwater detention wet ponds and dry ponds shall not be considered an outdoor amenity area.

**Section 3.** Section 2.5.2.A.2. of the Raleigh Unified Development Ordinance, Open Space Allocation – Primary Open Space, is hereby amended by insertion of the following underlined provisions:

2. Natural resource buffers required along primary and secondary watercourses (see open space bonus allowance in Sec. 9.2.3 A.1.d).

**Section 4.** Section 7.1.4. of the Raleigh Unified Development Ordinance, Parking; Vehicle Parking Reductions, is hereby amended by insertion of the following underlined provisions as a new section, “ E. Tree Preservation”, to the end of Section 7.1.4.:

**E. Tree Preservation**

1. Minimum required parking may be reduced by one parking space for each tree 12 inches in diameter or larger that is preserved within the parking lot or elsewhere on the development site within 50 feet of the parking area (reduction not to exceed 2 parking spaces or 10% of the total required parking spaces, whichever is greater). The preserved trees shall be specified on the recorded plat.

**Section 5.** Section 7.1.7.A.1. of the Raleigh Unified Development Ordinance, Parking; Vehicle Parking Lot Landscaping; Intent, is hereby amended by insertion of the following underlined provisions:

1. The intent of the vehicle parking lot landscaping requirements is to minimize the visual impacts of large areas of vehicular parking as viewed by the public right-of-way, minimize the impacts of stormwater runoff, and dissipate the effects of the urban heat island.

**Section 6.** Section 7.1.7.C.2. of the Raleigh Unified Development Ordinance, Parking; Vehicle Parking Lot Landscaping; Perimeter Islands, is hereby amended by insertion of the following underlined provisions:

2. A landscaped perimeter island must be a minimum of 5 feet wide, landscaped with shrubs installed at a rate of 30 shrubs per 100 linear feet that under typical conditions

can be expected to reach a height and spread of 3 feet within three years of planting. All shrubs shall be a minimum of 18 inches tall when planted. In lieu of planting a hedge, a wall at least three feet in height may be installed. GSI practices may be located in perimeter islands if part of an approved stormwater management plan for the site. The shrub requirements may be met within GSI practices.

**Section 7.** Section 7.1.7.D. of the Raleigh Unified Development Ordinance, Parking; Vehicle Parking Lot Landscaping; Interior Islands, is hereby amended by insertion of the following underlined provisions as a new section numbered “5.”:

5. GSI practices may be located in interior islands and terminal islands if part of an approved stormwater management plan for the site. Required shade trees may be placed within GSI practices. A maintenance plan must be approved for the GSI practices according to Sec. 9.2.2.D.

**Section 8.** Section 7.1.7.E. of the Raleigh Unified Development Ordinance, Parking; Vehicle Parking Lot Landscaping; Median Islands is hereby amended by insertion of the following underlined provisions as a new section numbered “5.”:

5. GSI practices may be located in median islands if part of an approved stormwater management plan for the site. Required shade trees and required shrubs may be placed within GSI practices. A maintenance plan must be approved for the GSI practices according to Sec. 9.2.2.D.

**Section 9.** Section 7.2.4.A. of the Raleigh Unified Development Ordinance, Landscaping and Screening; Protective Yards; Transitional Protective Yards, is hereby amended by insertion of the following underlined provisions as a new section numbered “3.”:

3. GSI practices shall be allowed in Transitional Protective Yard Types A2, B1 and B2. In order to accommodate GSI practices the number of shrubs may be reduced in Protective Yards by 10%.

**Section 10.** Section 7.2.4.B. of the Raleigh Unified Development Ordinance, Landscaping and Screening; Protective Yards; Street Protective Yards, is hereby amended by insertion of the following underlined provisions as a new section numbered “4.”:

4. GSI practices shall be allowed in Street Protective Yard Types C1, C2, and C3. In order to accommodate GSI practices the number of shrubs may be reduced in Protective Yards by ten (10) percent.

**Section 11.** Section 7.2.5.A.4. of the Raleigh Unified Development Ordinance, Landscaping and Screening; Screening; Drive-Thru Facilities, is hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

4. The following options may be used in lieu of compact evergreen hedge: (1) a combination of plants within GSI practices proposed to be part of an approved stormwater management plan and evergreen plants outside such GSI practices that together, at the time of planting, provide screening at least 36 inches above the level of the ground adjacent to the GSI practice, and reach a height at least 48 inches above adjacent ground level within 3 years of planting; or (2) a screening wall with a minimum height of 48 inches may be installed. The wall must be compatible with the principal building in terms of texture, quality, material, and color.

**Section 12.** Section 7.2.7.C.1.d. of the Raleigh Unified Development Ordinance, Design and Installation; Plant Material, is hereby amended by deletion of provisions indicated by strikethrough:

- d. ~~Trees cannot be planted within a tree conservation area or the critical root zone of an existing tree. and must be planted at least 15 feet from any other tree and no further than 50 feet from any other tree, measured from tree trunk to tree trunk.~~

**Section 13.** Section 7.2.7.C.4.a. of the Raleigh Unified Development Ordinance, Design and Installation; Plant Material , Additional Requirements for Trees in a Protective Yard, is hereby amended by insertion of the following underlined provisions:

- a. In a protective yard, 50% of required trees shall be locally-adaptive evergreen species, except where an approved GSI practice is within a protective yard.

**Section 14.** Section 7.2.7.C.5.b. of the Raleigh Unified Development Ordinance, Design and Installation; Plant Material, Shrubs, Protective Yard, is hereby amended by insertion of the following underlined provisions as a new section numbered “vi.”:

- vi. To accommodate multi-functional GSI practices as part of an approved stormwater management plan, the number of shrubs may be reduced in Protective Yards by 10%, non-evergreen species may be used in lieu of up to 35% of evergreen shrubs, and all shrubs may be 24 inches when planted.

**Section 15.** Section 8.4.1.D.2 and D.3 of the Raleigh Unified Development Ordinance, New Streets; General Provisions; Tree Planting, is hereby amended by insertion of the following underlined provisions:

2. Where overhead utilities exist, 1 understory tree shall be planted every 20 feet on center, on average. Required understory trees may be installed within GSI practices. Up to 20% of required understory trees may be offset by installing vegetated GSI practices, such as stormwater planter boxes. A maintenance plan must be approved for the GSI practice according to Sec. 9.2.2.D.
3. All required street trees must meet the design and installation requirements of Sec. 7.2.7. If a GSI practice is part of an approved stormwater management plan for the site, required street trees may be installed within the GSI practice. A maintenance plan must be approved for the GSI practice according to Sec. 9.2.2.D.

**Section 16.** Sections 8.5.1.D.2 and D.3 of the Raleigh Unified Development Ordinance, Existing Streets; General Provisions; Tree Planting, are hereby amended by insertion of the following underlined provisions:

2. Where overhead utilities exist, 1 understory tree shall be planted every 20 feet on center, on average. Required understory trees may be installed within GSI practices. Up to 20% of required understory trees may be offset by installing vegetated GSI practices, such as stormwater planter boxes. A maintenance plan must be approved for the GSI practice according to Sec. 9.2.2.D.
3. All a required street trees must meet the design and installation requirements of Sec. 7.2.7. If a GSI practice is part of an approved stormwater management plan for the site, required street trees may be installed within the GSI practice. A maintenance plan must be approved for the GSI practice according to Sec. 9.2.2.D.

**Section 17.** Section 8.5.2. of the Raleigh Unified Development Ordinance, Existing Streets, Streetscape Types, is hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

The required streetscape type is determined by the zoning district or by the designated frontage. Where there is conflict between a designated frontage and the zoning district, the designated frontage standard applies. Dimensional standards for planting area, tree spacing, and utility placement and the planting type may be varied to accommodate GSI practices. The Planning and Development Officer and the Urban Forester shall make the final

determination. Design specifications for streetscape improvements can be found in the Raleigh Street Design Manual, ~~and~~ the City Tree Manual, and the City Stormwater Design Manual.

**Section 18.** Article 8.6. of the Raleigh Unified Development Ordinance, Reimbursements, is hereby amended by insertion of the following a new section numbered as “8.6.5.” and titled “Stormwater Infrastructure”:

**8.6.5. Stormwater Infrastructure**

**A. Improvements Eligible for Reimbursement**

The City may reimburse a developer for stormwater infrastructure improvements that are over and above improvements needed for the development to comply with any ordinance or regulation.

1. The following improvements may be eligible for reimbursement:
  - a. Stormwater treatment practices, including GSI practices, for treating stormwater otherwise conveyed within street rights-of-way; and
  - b. Stormwater conveyances, including pipes, culverts, ditches, swales, and channels, associated with and needed for such stormwater treatment practices.
2. Eligibility for reimbursement shall be subject to availability of funds and to prior determination of eligibility for reimbursement by the Engineering Services Director or a designee in accordance with the requirements of G.S. 160A-309.

**B. Method and Conditions of Reimbursement**

1. The obligations of the parties and reimbursement schedule shall be established in a written agreement between the developer and the City.

**Section 19.** Sections 8.8.2.B.1 and B.7 of the Raleigh Unified Development Ordinance, Piping of Watercourses; Retaining Stormwater Onsite and Piping of Watercourses, are hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

- B. The City encourages retaining stormwater onsite through rainwater harvesting, infiltration, and/or evaporation and through preserving natural drainage features. All natural watercourses shall remain open and unaltered unless piping, enclosing, or

altering is requested and justified.., but then only when the following conditions are met:

1. Where the Engineering Services Director has determined that an existing public or private storm drainage system is reasonably available, tThe developer must either connect the development pipe system to said an existing public or private pipe storm drainage system or, during the administrative site review meeting for the development, propose options for using GSI practices as a part the site’s stormwater management plan.~~when such system is determined by the Engineering Services Director of Public Works to be reasonably accessible.~~
  
7. Where natural drainage systems are used or where an approved pipe drainage system cannot be connected to an existing public pipe drainage system, a developer must ~~do all the grading~~ grade to assure positive flow of ~~stormwaters of runoff from the design storms~~ and provide ~~all~~ drainage structures that are necessary to properly carry stormwater to locations which are acceptable to the ~~Public Works~~Engineering Services Director. Such grading shall not preclude the use of practices that retain the stormwater onsite.

**Section 20.** Section 9.2.2.B.1. of the Raleigh Unified Development Ordinance, Active Stormwater Control Measures; Nitrogen Reduction, is hereby amended by insertion of the following underlined provisions labeled as a new section “c.”:

- c. Stormwater control measures shown on the stormwater control master plan for a new development or expansion of existing development that are demonstrated to control stormwater on a runoff volume basis will be deemed to meet the nitrogen export load requirement, provided that the post-development volume of stormwater leaving the site is equal to or less than the pre-development volume of stormwater leaving the site based on the 90<sup>th</sup> percentile storm. For the purpose of meeting this requirement for new development sites, the pre-development land cover must be assumed to be forested for the entire development site. For redevelopment of a developed site, any impervious area added as part of the redevelopment must be assumed to be forested in the pre-development condition. In any case, output from appropriate Nutrient Sensitive Waters methodology shall be provided to the City for purposes of recordkeeping and reporting.

**Section 21.** Section 9.2.2.E.2.c. of the Raleigh Unified Development Ordinance, Stormwater Runoff Controls; Exemptions, is hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

- c. The maximum impervious surface coverage for the lot, including existing impervious cover is not more than ~~15~~10 %, and the remaining pervious portions of the lot are utilized to convey and control the stormwater to the maximum extent practical.

**Section 22.** Section 9.2.3 A.1. of the Raleigh Unified Development Ordinance, Watercourse Buffers; Natural Resource Buffers; General Rules, is hereby amended by insertion of the following underlined provisions:

- d. Open space requirements for Conservation Development and Compact Development (Sec 2.5), and Planned Development (Sec. 4.7) may receive an open space bonus if the site exceeds the minimum natural resource buffer requirement. The open space bonus shall be based on a sliding-scale factor from 0.9 (10% greater than required buffer) to 0.5 (100% greater than required buffer). The open space credit factor shall be determined as follows: (Area of required natural resource buffer)/(Area of proposed natural resource buffer) = Credit Factor. See required buffer area in Section 2.5.2.A.2. This credit factor may be multiplied times the required open space area and may meet up to 50% of Conservation Development, Compact Development, and Planned Development open space requirements. This bonus does not apply to open space requirements in Section 9.2, Stormwater Management.

**Section 23.** Section 9.5.1.C.1. of the Raleigh Unified Development Ordinance, Urban Watershed Protection Overlay District; Required Stormwater Measures, is hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

**1. Stormwater Retention, Detention and Capture**

- a. Within any primary or secondary watershed protection area, lots which are connected to both City water and sewer utilities and have a total maximum impervious surface of more than 24%, provided that the first ½ inch of stormwater which directly or indirectly runoff off the surface in excess of 24%, from the lot is:
  - i. Retained for either water harvesting and use on the site, infiltration into the soil, or for evaporation into the air, or a combination of these;

- ii. Detained for at least a 12-hour period;~~or~~
- iii. Captured by an approved stormwater treatment device~~;~~ or
- iv. A combination of the above.

**Section 24.** Section 9.5.2. of the Raleigh Unified Development Ordinance, Falls Watershed Protection Overlay District, is hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

**A. Natural Resource Buffer Yards**

Natural resource buffer yards consistent with *Sec. 9.2.3* must be established.

**B. Impervious Surface Coverage**

1. ~~All~~ For all lots or portions of lots in existence prior to March 1, 1988 or lots established outside the subdivision process after this date, no additional impervious surface may be added to the property which would result in greater coverage by impervious surface or by built-area than allowed by the following table:

Area	No Stormwater Control Measures	Retention, Detention or Capture First Half Inch of Runoff	<u>Management of Wet Ponds</u> <del>Capturing</del> First Inch of Rainfall
Primary water supply watershed protection areas	6% <u>impervious surface</u> ; or 3,500 sq. ft. if this is not more than 12% <u>impervious surface</u>	N/A	N/A
Secondary water supply watershed protection areas not connected to both City water and sewer utilities	12% <u>impervious surface</u> ; or 3,500 sq. ft. if this is not more than 24% <u>impervious surface</u>	N/A	N/A
Secondary water supply watershed protection areas with connections to both City water and sewer utilities	12% <u>impervious surface</u> ; or 3,500 sq. ft. if this is not more than 24% <u>impervious surface</u>	24% <u>impervious surface</u>	30% <u>built area</u> ; or 3,500 sq. ft. if this is not more than 50% <u>built area</u> ; 70% <u>built area</u> in areas designated in the Comprehensive Plan for higher impervious surfaces

2. Impervious surfaces and built areas include all proposed public and private streets within the development approved after June 20, 1993 and all impervious surfaces and built areas on any lot and common area.
3. Calculation of the area of the development includes all subdivision lots, new street rights-of-way established after June 20, 1993 and common area within the watershed. Calculation of the area of the development excludes any widening of existing street rights-of-way, existing street rights-of-way and new street rights-of-way reserved in accordance with the Roadway Corridor Official Map Act, N.C. Gen Stat. Chapter 136 Article 2E.
4. All lots established after June 20, 1993 must comply the impervious surface coverage standards and the built area coverage standards of the Article.
5. Substitutions of impervious surfaces in accordance with *Sec. 10.3.5.A.* are allowed.

**C. Required Stormwater Measures**

**1. Stormwater Retention, Detention and Capture**

- a. Within any secondary watershed protection area, lots which are connected to both City water and sewer utilities and have a total maximum impervious surface of more than 3,500 square feet may have an impervious coverage of more than 12% and less than 24%; provided that the first ½ inch of stormwater which directly or indirectly runs off the surfaces in excess of 12%, from the lot is:
  - i. Retained for ~~either water harvesting and use on the site,~~ infiltration into the soil, or for evaporation into the air, or a combination of these;
  - ii. Detained for at least a 12-hour period;~~or~~
  - iii. Captured by an approved stormwater treatment device~~;~~ or
  - iv. A combination of the above.
- b. Built area coverage of 24% or higher ~~Additional impervious surface coverage~~ is allowed in secondary reservoir watershed protection areas when the first inch of rainfall (including the amount from the first 24% ~~built area impervious surface coverage~~) is captured ~~by a wetpond~~ by an approved stormwater treatment device. Such runoff must be managed in accordance with *Sec.9.5.2.C.3* below.

**2. Stormwater Runoff From Streets**

- a. Where impervious surface coverage is equal to or less than 12% in any primary water supply watershed protection area or equal to or less than 24% in any secondary water supply watershed protection area, the first ½ inch of stormwater runoff which runs off any street must be contained within the development capture methods set forth in *Sec. 9.5.2.C.1* above.
- b. Where impervious surface coverage is greater than 12% in any primary water supply watershed protection area or greater than 24% in any secondary water supply watershed protection area, the first inch of rainfall from streets must be ~~captured in a wetpond~~ managed in accordance with *Sec. 9.5.2.C.3* below.

**3. Use of GSI in Secondary Watershed Protection Areas ~~Wet Ponds~~**

- a. When built area impervious surfaces exceeds 24% in secondary reservoir watershed protection areas, runoff from the first inch of rainfall within an the entire development site ~~shall be captured in a wetpond of standing water~~ must be controlled on a runoff volume basis such that the post-development volume of stormwater leaving the site is equal to or less than the pre-development volume of stormwater leaving the site based on the 90<sup>th</sup> percentile storm. For the purpose of meeting this requirement for new development sites, the pre-development land cover must be assumed to be forested for the entire development site. The developer may request, and the City may approve, a design exception to this requirement based on one or more of the following criteria:
  - i. Low infiltration rates of native soils on the site.
  - ii. Shallow depth to seasonally high groundwater table on the site.
  - iii. Shallow depth to bedrock on the site.
  - iv. Other hardship approved by the Engineering Services Director based on site conditions.

In requesting a design exception to this requirement, the developer must demonstrate that runoff resulting from the first inch of rainfall over the entire development site will be detained or retained using conventional stormwater treatment practices, GSI practices, or a combination.

**Section 25.** Section 9.5.3. of the Raleigh Unified Development Ordinance, Swift Creek Watershed Protection Overlay District, is hereby amended by insertion of the following underlined provisions and deletion of provisions indicated by strikethrough:

**A. Natural Resource Buffer Yards**

Natural resource buffer yards consistent with *Sec. 9.2.3* must be established.

**B. Impervious Surface Coverage**

1. ~~All~~ For all lots or portions of lots in existence prior to March 1, 1988 or lots established outside the subdivision process after this date, no additional impervious surface may be added to the property which would result in greater coverage by impervious surface or by built-area than allowed by the following table:

Area	No Stormwater Control Measures	Retention, Detention or Capture First Half Inch of Runoff	<u>Management of Wet Ponds</u> <del>Capturing</del> First Inch of Rainfall
Primary water supply watershed protection areas	6% <u>impervious surface</u> ; or 3,500 sq. ft. if this is not more than 12% <u>impervious surface</u>	N/A	N/A
Secondary water supply watershed protection areas not connected to both City water and sewer utilities	12% <u>impervious surface</u> ; or 3,500 sq. ft. if this is not more than 24% <u>impervious surface</u>	N/A	N/A
Secondary water supply watershed protection areas with connections to both City water and sewer utilities	12% <u>impervious surface</u> ; or 3,500 sq. ft. if this is not more than 24% <u>impervious surface</u>	24% <u>impervious surface</u>	30% <u>built area</u> ; or 3,500 sq. ft. if this is not more than 50% <u>built area</u> ; 70% <u>built area</u> in areas designated in the Comprehensive Plan for higher impervious surfaces

2. Impervious surfaces and built areas include all proposed public and private streets within the development approved after June 20, 1993 and all impervious surfaces and built areas on any lot and common area.

3. Calculation of the area of the development includes all subdivision lots, new street rights-of-way established after June 20, 1993 and common area within the watershed. Calculation of the area of the development excludes any widening of existing street rights-of-way, existing street rights-of-way and new street rights-of-way reserved in accordance with the Roadway Corridor Official Map Act, N.C. Gen Stat. Chapter 136 Article 2E.
4. All lots established after June 20, 1993 must comply the impervious surface coverage standards and the built area coverage standards of the Article.
5. Substitutions of impervious surfaces in accordance with *Sec. 10.3.5.A.* are allowed.

## C. Required Stormwater Measures

### 1. Stormwater Retention, Detention and Capture

- a. Within any secondary watershed protection area, lots which are connected to both City water and sewer utilities and have a total maximum impervious surface of more than 3,500 square feet may have an impervious coverage of more than 12% and less than 24%; provided that the first ½ inch of stormwater which directly or indirectly runs off the surfaces in excess of 12%, from the lot is:
  - i. Retained for either water harvesting and use on the site, infiltration into the soil, or for evaporation into the air, or a combination of these;
  - ii. Detained for at least a 12-hour period;~~or~~
  - iii. Captured by an approved stormwater treatment device;~~;~~ or
  - iv. A combination of the above.
- b. Built area coverage of 24% or higher ~~Additional impervious surface coverage~~ is allowed in secondary reservoir watershed protection areas when the first inch of rainfall (including the amount from the first 24% ~~built area impervious surface coverage~~) is captured ~~by a wetpond~~ by an approved stormwater treatment device. Such runoff must be managed in accordance with *Sec.9.5.3.C.3* below.

### 2. Stormwater Runoff From Streets

- a. Where impervious surface coverage is equal to or less than 12% in any primary water supply watershed protection area or equal to or

less than 24% in any secondary water supply watershed protection area, the first ½ inch of stormwater runoff which runs off any street must be contained within the development capture methods set forth in *Sec. 9.5.3.C.1* above.

- b. Where impervious surface coverage is greater than 12% in any primary water supply watershed protection area or greater than 24% in any secondary water supply watershed protection area, the first inch of rainfall from streets must be ~~captured in a wet pond~~ managed in accordance with *Sec. 9.5.3.C.3* below.

**3. Use of GSI in Secondary Watershed Protection Areas ~~Wet Ponds~~**

- a. When built area impervious surfaces exceeds 24% in secondary reservoir watershed protection areas, ~~runoff from the first inch of rainfall within an~~ the entire development site shall be captured in a wet pond of standing water must be controlled on a runoff volume basis such that the post-development volume of stormwater leaving the site is equal to or less than the pre-development volume of stormwater leaving the site based on the 90<sup>th</sup> percentile storm. For the purpose of meeting this requirement for new development sites, the pre-development land cover must be assumed to be forested for the entire development site. The developer may request, and the City may approve, a design exception to this requirement based on one or more of the following criteria:

- i. Low infiltration rates of native soils on the site.
- ii. Shallow depth to seasonally high groundwater table on the site.
- iii. Shallow depth to bedrock on the site.
- iv. Other hardship approved by the Engineering Services Director based on site conditions.

In requesting a design exception to this requirement, the developer must demonstrate that runoff resulting from the first inch of rainfall over the entire development site will be detained or retained using conventional stormwater treatment practices, GSI practices, or a combination.

**Section 26.** Section 12.2. of the Raleigh Unified Development Ordinance, Defined Terms, is hereby amended by insertion of the following underlined provisions in the appropriate alphabetical order:

**Built Area**

The sum of the horizontal areas of materials existing or placed at the ground surface that have impervious surfaces, as defined herein, that are not 0% impervious, including but not limited to permeable and semi-permeable pavements and pavers, green roofs, and living roofs.

**Green Stormwater Infrastructure (GSI)**

Any of a number of practices that, used individually or collectively, contribute to managing, treating, and reducing stormwater runoff from a development or redevelopment site, as close as possible to the runoff's source, by preserving natural landscape features (such as vegetation, soils, hydrology, and natural processes) and/or by mimicking natural processes through installation and maintenance of structurally engineered devices (such as bioretention cells, bioswales, permeable paving/pavers, green roofs, stormwater street trees, and cisterns). In addition to contributing to stormwater management, GSI practices can enhance site aesthetics, improve air quality, reduce urban heat island impacts, provide shading, create wildlife habitat, reduce energy consumption, reduce infrastructure costs, and increase property values.

**Vegetated GSI Practices**

GSI practices that are predominantly vegetated at the surface of the practice. Examples of such practices include preserved natural areas, bioretention areas, and green roofs.

**Section 27.** Staff in the Engineering Services Department shall work with other City departments to update the following three technical manuals: the Raleigh Street Design Manual, the City Tree Manual, and the City Stormwater Design Manual. These manuals shall be updated to include any applicable language contained within this ordinance and include any technical specifications or engineering details that illustrate green infrastructure and low impact development devices.

**Section 28.** All laws and clauses of laws in conflict herewith are repealed to the extent of such conflict.

**Section 29.** If this ordinance or application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of the ordinance which can be given separate effect and to this end the provisions of this ordinance are declared severable.

**Section 30.** These text changes have been reviewed by the Raleigh City Planning Commission.

**Section 31.** This ordinance has been adopted following a duly advertised public hearing of the Raleigh City Council.

**Section 32.** This ordinance has been provided to the North Carolina Capital Commission as required by law.

**Section 33.** This ordinance shall become effective sixty (60) days after adoption. This ordinance shall not apply to any completed applications that are submitted to the City prior to the effective date of this ordinance.

**ADOPTED:** September 5, 2017

**EFFECTIVE:** November 4, 2017

**Distribution:** Planning – Bowers, Crane, Mitchell, Hodge, Reckhow, Little  
Development Services – Phyfer  
Stormwater – Hinkle, Boyer  
City Attorney – Seymour, Hargrove-Bailey  
Management Team DL  
Transcription Services – Taylor