

# Town of Colonie Enhanced Development Regulations White Paper: *Stormwater Management, Landscaping and Site Design and The Green Area Ratio*

April 2021



# Capital District Regional Planning Commission

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## 1.0 Executive Summary

The Town of Colonie requested planning assistance to identify methods of preserving and enhancing greenspace as a component of new development. The Town's 2019 Comprehensive Plan established several goals and actions identifying the need and opportunity to implement of programs and policies to strengthen Town Code and stormwater management controls to protect environmental assets, enhance quality and quantity of attractive landscaping features and utilize natural methods of stormwater controls to manage stormwater on site.

Following a review of the Town Zoning Code and Town Stormwater Regulations, CDRPC has found several areas of opportunity for the town to implement land use controls and site design requirements that will preserve and enhancing greenspace as a component of new development. This paper builds upon prior efforts of the Stormwater Coalition of Albany County, of which the Town is an active member, by incorporating previously recommended, but as of yet, unadopted code recommendations relating to stormwater management controls.

To meet the Town's Neighborhood Preservation Goal Actions in the Comprehensive Plan, "careful attention to building and site design, including the preservation of existing vegetation, as appropriate, should be incorporated into the project review process," CDRPC recommends new standards for Parking Lot Design and Tree Protections.

To meet the Town's Energy Goal Actions in the Comprehensive Plan, "incorporate provisions in zoning for the use of green infrastructure / low-impact design techniques to address stormwater management. Incentivize or require the use of these techniques as appropriate" CDRPC recommends adding definitions to town code, amending rooftop runoff requirements and creating density bonuses that consider Green Roofs as a feature.

To meet the Town's Natural Resources Goal Actions in the Comprehensive Plan, "strengthen standards regarding the clearing, grading of land, and replanting in anticipation of development to ensure that such activity conforms to an approved plan." CDRPC recommends Water Course Area Protections and Steep Slope Requirement Definitions.

To meet the Town's Land Conservation Goal Actions in the Comprehensive Plan, "continue to support the preservation of existing, and the development of new wildlife corridors in Town," CDRPC recommends policies for locating sites in less sensitive areas and strengthened clearing & grading requirements.

To meet the Town's Infrastructure Goal in the Comprehensive Plan, "consider adaptation strategies to ensure the resiliency of the Town's infrastructure in response to a changing climate," CDRPC recommends amended vegetated open channels requirements, amending stormwater control and site plan requirements and including stormwater and site design reference materials in code and on the Town Website.

To meet the Town's Streets and Sidewalks Goal in the Comprehensive Plan, "continue to maintain and enhance the Town's extensive water, sewer, and local roadway infrastructure.... Consider adaptation strategies to ensure the resiliency of the Town's infrastructure in response to a changing climate," CDRPC recommends design considerations and changes to the requirements for cul-de-sacs, sidewalks, curbs and permeable maintenance strips.

This paper also summarizes an innovative landscape policy, the Green Area Ratio (GAR). This program is an initiative the town could employ to ensure site design features like landscaping and stormwater controls meet the goals and actions outlined in the comprehensive plan. The Green Area Ratio could also simply the development review process by allowing for a quantitative assembly of landscape practices that could be assembled to meet a formula the town could easily adjust to influence specific practices or controls it wishes to promote. While this paper summarizes the purpose and effectiveness of a Green Area Ratio and identifies best practices – it is not an exhaustive or scientific review of its impact on air and water quality. In addition, while a model ordinance is provided, the effectiveness of the Green Area Ratio is directly tied to education, outreach, promotion and public input to define the scope and limits of the program. These elements of the implementation are not within the scope of the paper and should be carefully developed further should the Town wish to pursue the Green Area Ratio as a program. While the paper’s analysis concludes the GAR to be feasible and an effective tool, it must be supplemented with thoughtful and careful educational materials and guidance prior to any roll out.

## 2.0 Capital District Regional Planning Commission

### Mission

The Capital District Regional Planning Commission (CDRPC) is a regional planning and resource center serving Albany, Rensselaer, Saratoga, and Schenectady counties. CDRPC provides an objective analysis of data, trends, opportunities, and challenges relevant to the Region’s economic development and planning communities. CDRPC serves the best interests of the public and private sectors by promoting intergovernmental cooperation; communicating, collaborating, and facilitating regional initiatives; and sharing information and fostering dialogues on solutions to regional challenges.

### History

CDRPC was established as a regional planning board in 1967 by a cooperative agreement among the counties of Albany, Rensselaer, Saratoga, and Schenectady. Its original purpose was to perform and support comprehensive planning work, including surveys, planning services, technical services, and the formulation of plans and policies to promote sound and coordinated development of the entire Region. Over time, the mission of the Planning Commission evolved in response to changes in the Region’s needs, funding sources, organizational structure, and information technology. While continuing to provide a wide variety of comprehensive planning services, CDRPC has also assumed the functions of Data and Information Center, Economic Development District, Foreign-Trade Zone Administrator, Clean Energy Communities Program Coordinator, and Water Quality Manager.

### Technical Assistance Program

CDTC and the [Capital District Regional Planning Commission \(CDRPC\)](#) annually provide planning assistance to municipalities or municipally convened groups (i.e. appointed committees, planning boards, etc.) within the designated planning area of the CDTC and CDRPC, the four counties of Albany, Rensselaer, Schenectady and Saratoga. The program offers CDTC and CDRPC staff time and expertise to local governments undertaking small scale community planning initiatives. For this project, the Town requested CDTC and CDRPC staff to assist with improving the environmental sustainability of new development within the Town.

## 3.0 Scope of Work

The Town of Colonie requested planning assistance to identify methods of preserving and enhancing greenspace as a component of new development and to require Electric Vehicle (EV) infrastructure. This report recommends code modifications to incorporate Green Area Ratio (GAR) requirements in the Town of Colonie's Zoning Ordinance. A companion document, titled, "Town of Colonie Enhanced Development Regulations: Electric Vehicle Zoning Guidance & Best Practices," provides best practices in requiring Electric Vehicle (EV) Charging Stations.

The following tasks contain the scope of work for this project as outlined in the November 2020 project award letter for the Town of Colonie:

### **Task 1: Project Kick-Off**

A kick-off meeting will be conducted by video conference to finalize the scope of work and schedule. The project purpose and goals will be reviewed and refined.

### **Task 2: White Paper on Green Area Ratio**

CDRPC staff will research the use of Green Area Ratio as a landscape and site design tool to help reduce stormwater runoff, improve air quality, and maintain green space. Staff will review the purpose and effectiveness of a Green Area Ratio, identify best practices and identify model ordinances. The product of this task will be a white paper summarizing the research findings.

### **Task 3: White Paper on Electric Vehicle Ordinances**

CDRPC and CDTC staff will research best practices for developing an Electric Vehicle Ordinance. Staff will research model ordinance language, infrastructure requirements, parking capacity and use requirements. The product will be a white paper summarizing best practices and model ordinances.

### **Task 4: Zoning Code Audit and Recommendations**

CDRPC and CDTC staff will review of the Town's Zoning Ordinance to see how Green Area Ratio and Electric Vehicle (EV) charging station requirements can most easily and appropriately be incorporated. Recommendations will be made to the Town including model ordinance language which will be developed cooperatively with the Town's Planning and Economic Development staff. Task 5: Provide Green Infrastructure Recommendations.

If requested, presentation to the Town's Code Review Committee of this white paper.

## 4.0 Analysis of Comprehensive Plan Policies and Zoning Regulations

The Town of Colonie updated their Comprehensive Plan on June 13, 2019. The Town's Comprehensive Plan summarizes the Town's goals for growth, development, sustainability, conserving energy, protecting environment, and maintaining a high quality of life for residents. Zoning and Land Use Controls, together with Stormwater Regulations provide the town with a comprehensive set of rules to guide development and establish programs to implement the vision of the Comprehensive Plan.

Many of the Comprehensive Plan's recommendations seek to amend codes to encourage the use of green infrastructure and pervious surfaces for stormwater management. Green infrastructure, such as the

planting of trees, shrubs and grasses help slow rainfall allowing a higher degree of percolation into the soil and groundwater. Such vegetative cover also helps decrease the rate of surface water flow and, therefore, reduces the amount of soil, sediment and other particles carried off site and deposited in streams, rivers and lakes. Pervious surfaces allow rainfall to slowly filter into the ground.

On traditionally developed land, however, the volume and rate of surface runoff is substantially increased due to the clearing of vegetation, soil compaction by heavy equipment, and the construction of impervious surfaces and structures. Paved surfaces reduce the amount of natural ground cover for the filtering of rainwater. Further, since rain cannot filter through impermeable surfaces, the volume and rate of surface runoff increases. This in turn, accelerates the erosion of stream channels, alters runoff patterns, increases downstream flooding and carries more sediment and surface pollutants in streams, rivers and lakes. It also reduces the amount of water left for groundwater recharge, soil moisture replenishment, and the base flow of water available to streams during dry periods, therefore, potentially impacting human water supplies and plant and animal habitats. Runoff from carries pollutants, which, because of the Town's Stormwater permit, must be monitored at stormwater outfalls. Paved areas can also contribute to surface flooding and urban heat island effects.

Several of the recommendations contained within this report were drafted for a report published by the Stormwater Coalition of Albany County in 2013. The Coalition, comprised of eleven municipalities, Albany County, and the University at Albany (SUNY) provides mutual support and assistance in implementation of the New York State Department of Environmental Conservation (NYSDEC) Municipal Separate Storm Sewer System (MS4) Permit requirements. The Town of Colonie is a member municipality. In 2010, the Coalition applied for a NYSDEC Water Quality Improvement Grant to provide funding assistance to carry out several elements of the NYSDEC MS4 Permit. Among those elements is that municipalities are encouraged to review and revise, where appropriate, local codes and laws which preclude green infrastructure and, to the maximum extent practical, consider the principles of Low Impact Development, Better Site Design, and Green Infrastructure when developing planning documents and updating regulations. The Coalition inventoried comprehensive plans and local laws for green infrastructure strategies and smart growth principles utilizing guidance documents such as New York State Smart Growth Principles, NY Code Ordinance Worksheet, LEED for Neighborhood Development (2009), and U.S. EPA Managing Wet Weather with Green Infrastructure Municipal Handbook-Water Quality Scorecard (April 2009). The project consultant team developed model local law language based upon each of participating communities' responses to a code audit survey. The laws proposed by the Coalition are intended to comply with the New York State Department of Environmental Conservation's SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems, (Permit No. GP-0-10-002). A summary report, in addition to the full set of Coalition recommendations are available on the Coalition's Website, <http://stormwateralbanycounty.org>.

What follows is CDRPC's review of the Town's Comprehensive Plan's goals and strategies relating to landscaping, stormwater management, parking, sustainability and environmental conservation for potential code changes, and CDRPC recommendations.

## 4.1 Neighborhood Preservation

***Goal: Continue to accommodate the provision of a range of housing types in appropriate locations to meet the diverse needs of Colonie's residents. Provide incentives to encourage affordability, mixed-income developments and multigenerational neighborhoods.***



*Action: Review provisions in zoning to better address the transition from commercial, mixed-use, and higher-density residential zones to adjoining residential neighborhoods. Careful attention to building and site design, including the preservation of existing vegetation, as appropriate, should be incorporated into the project review process.*

#### 4.1.1 Current Parking Lot Landscaping Requirements

Chapter 190: Zoning and Land Use/Ch 190 Art IX: Design Standards

§ 190-40, § 190-41, § 190-42, 190-43 all contain the same requirements:

- *Parking lots should be generously landscaped to provide shade, reduce glare and provide visual interest.*
- *At least 15% of shared parking lots shall be landscaped. Lots shall be screened from view with architectural walls, berms or shrubs.*
- *For parking areas greater than 20 stalls, a minimum 20 square feet of landscaped island shall be included in the interior of the parking area for each stall. An island shall be considered to be in the interior of the parking area if at least 75% of its perimeter abuts parking area pavement.*
- *For parking areas greater than 20 stalls, a minimum of 20 square feet of landscaped island shall be included in the interior of the parking area for each stall. An island shall be considered to be in the interior of the parking area if at least 75% of its perimeter abuts the parking area pavement.”*
- *Off-street parking areas shall have landscaped buffers at least 15 feet in width between the parking area and edge of the sidewalk or front lot line, whichever is closer, which includes trees, hedges, shrubs and/or low walls consisting of wood, brick, wrought iron or an acceptable substitute.*

#### 4.1.2 Parking Lot Design Recommendations

Parking lots are one of the “lowest hanging fruits” for implementing sustainable and attractive design standards. Most commercial and industrial land uses are accompanied by parking lots, thus, any code changes to parking lot landscaping and stormwater requirements will be far-reaching. CDRPC recommends the Town consider amending their code as it relates to Site Design with the following provisions.

When incorporated appropriately, parking lot landscaping can do more than provide an aesthetic benefit. While trees have long been recognized for their ability to help clean the air, reduce energy needs, raise property values, and mitigate heat island effects, their innate ability to absorb and divert rainfall has been underutilized. Trees have proven value in reducing runoff and mitigating the costs of stormwater management. In fact, research by the United States Forest Service has shown the environmental and economical values trees contribute to the community.

The Town should consider revising the Parking Standards town-wide to require at least ten percent of the surface area occupied by vehicle parking spaces be landscaped, inclusive of driving aisles and driveways necessary for access to and circulation among those spaces.

Recessed, bioretention islands should incorporate the following features:

- i. Any curbs installed at the edges of required perimeter and interior landscaped areas shall have openings that allow drainage from the pavement to enter and percolate through the landscaped areas.
- ii. Mulch shall not be installed adjacent to any sidewalk, parking area, or driveway with less than a one foot border of grass or other permanent live groundcover to ensure mulch is not washed into the drainage system.

Where a parking area or lot for 10 or more spaces is adjacent a lot containing a principal Residential use, and the parking lot is not separated from the adjacent property by a principal or accessory structure, the parking area or lot shall be screened from the adjacent district or use by one or both of the following, located within five feet of the front lot line:

1. A masonry wall (not including Concrete Masonry Unit blocks) between 30 and 36 inches in height; or
2. A decorative wrought-iron-style fence between 30 and 42 inches in height, with masonry piers that may extend to 48 inches in height. Masonry piers may not exceed 18 inches in width, viewed from the street, and may not occupy more than 20 percent of the length of the fence.
3. A continuous line of shrubs that achieves 80 percent opaque screening between 30 and 48 inches in height during summer months.

#### **Minimum Action Level**

a) Landscaped areas in a project site plan, including in parking lots, shall be lowered and incorporate curb cuts or other diversion devices to divert stormwater to the landscaped areas as part of a stormwater management plan.

b) Parking lots shall include one tree for every 1,200 feet of impervious parking area. Sufficient permeable or infiltration areas shall be provided around the expected radius of the mature tree to provide infiltration for the tree drip area. Existing mature trees shall not be included in the calculation for minimum trees except for areas where the existing mature tree canopy extends over impervious surfaces. Tree plantings may be designed as tree pits for stormwater treatment as provided in the latest version of the New York State Stormwater Management Design Manual.

#### **Best Management Action Level (all of the Minimum Actions plus the following)**

c) For every impervious parking space, the site plan shall include at least 20 square feet of vegetated area within the parking lot. "Within the parking lot" means that at least 75% of the perimeter of the landscaped area is located within the parking lot. Vegetated areas must include native non-invasive species and may be used for green infrastructure stormwater practices.

### **Model Community Action Level (all of the Minimum and Best actions plus the following)**

Surface parking lots with more than two rows of parking shall include a minimum of a 4' wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following: "Landscaping should include a minimum of one tree island containing at least 50 square feet of land area, which shall include at least one medium shade tree or larger for every 20 parking spaces. Parking lot screening at the perimeter of the lot should not be used to meet this the percent landscaping requirement. Surface parking lots with more than two rows of parking shall include a minimum of a 4' wide landscaping islands between rows. These islands shall include curb cuts/wheel stops to allow entry of stormwater for treatment/infiltration. Landscaped areas shall utilize tree plantings, native vegetation, dry swales, stormwater planters, tree pits, or bioretention in center islands between parking rows. Stormwater management features must be designed in accordance with the latest version of the New York State Stormwater Management Design Manual and shall include the following:

- Trees shall have dense canopy for rainfall interception, being round, oval, or v-shaped in form.
- Trees used shall be native and have proven observed salt tolerance if applicable.
- The area of the parking lot subject to vehicular traffic, that also corresponds to the mature tree's canopy area, shall incorporate structural measures to prevent soil compaction and root damage. This may be accomplished by use of a soil structure specifically designed to withstand observed traffic loading.
- Water must be allowed to infiltrate to the tree roots in an amount to ensure tree survival with minimal watering after the first year.
- Soil volume must be the amount required for the specific tree and intended function.
- Trees shall be selected based on several factors, including observed local healthy tree stands in similar applications, existing and anticipated soil compaction, existing pH, planned water availability, adjacent road maintenance (salt, sand, etc.), presence of overhead utilities, availability of sunlight, percolation rate, soil's ability to circulate air, and soil type.
- Because paved parking lots and the cars associated with them can raise local temperatures by up to 20 degrees, trees selected near heat islands should be tolerant of these conditions.
- Trees shall be selected based on best landscape practices, using the guidance document "Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance", as published by the Urban Horticultural Institute, Department of Horticulture, Cornell University, Ithaca, NY or other industry accepted standard at the discretion of the Town.
- All parking lot runoff is required to flow through a planted area to cool runoff temperatures before entering the storm drain system.
- Parking lots larger than 1,200 sf, located on soils of hydrologic soil groups A, B, or C, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 20% of the parking lot area.

Parking lots larger than 1,200 sf, located on soils of hydrologic soil group D, excluding the area reserved for vegetation and stormwater management, are required to be construction of impervious paving material over a minimum of 10% of the parking lot area.

### 4.1.3 Trees, Clearing and Grading

Per the Comprehensive Plan action, *the preservation of existing vegetation, as appropriate, should be incorporated into the project review process.*

### 4.1.4 Current Trees, Clearing and Grading Requirements

#### ***Chapter 177 § 177-1 Findings***

*The Town Board of the Town of Colonie hereby finds that excessive cutting of trees upon large tracts of land has resulted in creating increased surface drainage and increased soil erosion, thereby causing increased municipal costs to control drainage within the Town and impairing the benefits of occupancy of existing residential and commercial property in such areas and impairing the stability and value of both improved and unimproved real property in such areas with attendant deterioration of conditions affecting health, safety and general welfare of the inhabitants of the Town.*

#### ***§ 177-3 Restrictions on cutting and removal***

*The Planning Board of the Town of Colonie is empowered to require that trees will be left standing in areas upon the plat or subdivision, and no live tree exceeding three inches in diameter may be cut down in such areas without expressed consent of the Planning Board, to be indicated upon the approved plan. The Planning Board may also require that trees shall not be cut down on or removed from any building plot on the subdivision unless the area is to be occupied by the building thereon. In such instance trees may be cut down in area to be occupied by buildings or driveways and within a distance of 10 feet around the perimeter of such buildings or driveways.*

### 4.1.5 Tree Protection Recommendations

*Minimizing the removal of trees and preserving mature trees protects the environment by reducing stormwater runoff, maintaining habitat, promoting clean air and reducing heat island effects. As part of its site plan review, the Planning Board shall review and approve a tree preservation plan that minimizes to the maximum extent practicable the removal of trees.*

*a. Projects clearing 0.5 acres or greater of undisturbed land. The site plan application shall identify the location of all major vegetation including all trees larger than 6 inches dbh. In approving a site plan that meets the objectives of the applicant, the Planning Board shall minimize the loss of trees by identifying the following for preservation:*

- i. Trees that are important to the site or neighborhood due to their size, age or rarity.*
- ii. Trees located in environmentally sensitive areas such as wetlands.*
- iii. Trees that offer visual screening or noise buffers to adjoining properties.*
- iv. Trees that shelter other trees from strong winds or are part of a continuous and mutually dependent canopy.*

*b. the applicant shall undertake the following:*

- i. *If development of the project will require the disturbance of tree root zones, a certified arborist or registered landscape architect shall prepare a detailed tree protection plan which protects root zones to the maximum extent practicable, prior to the commencement of site activities and a copy of the plan shall be provided to the Building Inspector.*
- ii. *The applicant shall prevent damage to the trunks of trees identified for preservation. In extremely confined work zones, there shall be a protective barrier placed around the tree. Where disturbance of roots is necessary, excavation within the root zone shall be done with extreme care using hand tools to prevent unnecessary damage to adjacent fibrous root structures. Roots should be pruned using clean vertical cuts that do not fray or strip the roots.*
- iii. *Trees that have had their roots pruned shall also have their canopy pruned in direct proportion to the amount of root trimming as provided in the tree protection plan.*
- iv. *Any trees which are removed during development of the site plan which were not previously approved for removal by the Planning Board shall be replaced with equivalent trees unless otherwise waived by the Planning Board.*

*Nothing contained herein shall preclude a property owner from removing trees identified for preservation, which are diseased, severely damaged or otherwise present a threat to public health or safety.*

## 4.2 Energy

***Goal: Continue to evaluate opportunities where renewable energy systems, coupled with energy efficiency measures, could be incorporated into Town buildings and facilities to reduce fossil fuel use, reduce the Town's carbon footprint, and stabilize or reduce the Town's energy costs.***

***Action: Incorporate provisions in zoning for the use of green infrastructure / low-impact design techniques to address stormwater management. Incentivize or require the use of these techniques as appropriate.***

CDRPC recommends the Town consider amending Town code with the following provisions, incorporating green infrastructure practices into the code as a mechanism to promote energy conservation.

### 4.2.1 Definition Recommendations

The Town should consider adding the following definitions to the Town Zoning Ordinance, Article II, §190-6 to provide clarity and specifically articulate practices and programs that support the implementation of green infrastructure and energy savings programs:

**Greenspace:** That portion of land shown on a development plan, Master Plan or Official Map the purpose of which is intended for open space preservation, recreation (active or passive), landscaping, green infrastructure for the express purpose of managing stormwater, or parkland. Unless otherwise required by the Planning or Town Board, said lands shall be undisturbed and seeded and planted with appropriate materials or left in their natural state.

**Green infrastructure:** Practices that maintain or restore stormwater's natural flow pattern by allowing the water to slowly permeate into the ground, evaporate and/or be used by plants. Practices include rain gardens, bioretention, vegetated swales, green roofs and porous pavements. Practices may also include

rainwater harvesting systems such as cisterns and underground storage for reuse. Green infrastructure also includes preserving or restoring natural areas, such as forests, stream buffers and wetlands, and reducing the size of paved surfaces. Green infrastructure can recharge groundwater, provide wildlife habitat, beautify neighborhoods, cool urbanized areas, improve air quality and reduce stress on sewer systems.

**Cistern:** Large tanks that store rainwater collected from impervious surfaces for domestic, non-potable uses including, but not limited to, flushing toilets, irrigation, cleaning laundry, and washing cars. A cistern employed as part of a stormwater management practice must not overflow into the sanitary sewer. Cistern overflows must be directed to a Green Infrastructure practice that allows water to infiltrate back into the ground. Cisterns and plumbing to support rainwater harvesting must conform to NYS Plumbing Code, specifically Section 1303, Nonpotable Collection and Distribution Systems.

**Green Roof:** A vegetated roof design that is explicitly designed to absorb rainfall or snowmelt, typically to manage stormwater, mitigate the heat island effect, provide habitat for urban wildlife, or offer leisure and recreational space for building occupants.

#### 4.2.2 Rooftop Runoff Recommendations

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by directing rooftop runoff into landscaped areas and other infiltration devices and avoiding direct discharge into watercourses or areas that can cause erosion.

These provisions can best be inserted in subdivision laws and zoning law sections governing site plan review. In most municipalities, single and two-family homes on existing lots do not require site plan approval so these provisions would be difficult to impose upon new construction of those residences absent a stand-alone law or an expansion of the scope of the zoning law.

##### **Minimum Action Level**

a. Site Plan Review: All buildings included in any site plan approval shall be designed with rooftop stormwater conveyance systems that direct stormwater away from roads and parking lots and to vegetated areas with hydrologic soil groups A and B and soils with an infiltration capacity of more than 0.5 inches/hour.

b. Subdivision Review: All buildings to be constructed in an approved subdivision shall be designed with rooftop stormwater conveyance systems that direct stormwater away from roads and parking lots and to vegetated areas with hydrologic soil groups A and B and soils with an infiltration capacity of more than 0.5 inches/hour.

##### **Best Management Action Level (all of the Minimum Actions plus the following)**

a. Rooftop runoff shall be diverted to a series of rain barrels (or similar rainwater harvesting container); a grassed or vegetated area; a rain garden; a vegetated open channel; an infiltration trench, a pervious surface or a combination of the above or similar measures. All measures shall be designed in accordance with the most recent New York

b. State Stormwater Management Design Manual.

##### **Model Community Action Level (all of the Best Actions plus the following)**

a. For all applications for site plan approval, the [municipality] encourages applicants to consider installing Green roofs on all new commercial and multi-family residential structures and on non-enclosed covered

areas of 100 square feet or larger. Non-enclosed covered areas include parking structures, covered picnic areas and covered courtyards.

b. When an applicant provides a green roof on a new or renovated building and the green roof encompasses at least 80% of the available rooftop area, (excluding the area occupied by mechanical equipment, skylights, vents and other required appurtenances) the applicant shall be entitled to a density bonus up to 20% of the applicable Floor Area Ratio (FAR), lot coverage limits or height restriction without requiring a variance and provided the building complies with all setback requirements.

c. Buildings with green roofs must have a maintenance plan that is recorded with the municipality and filed with the deed. Green roofs must be inspected annually by a qualified inspector and the inspection reports must be filed with the municipality within two weeks of the date of the inspection.

### 4.2.3 Density Bonus Recommendations for Progressive Stormwater Management Practices

Article XIV, Stormwater Management and Erosion and Sediment Control, §190-79 establishes the performance guidelines for on-site stormwater management. The town should consider expanding upon the density bonus project eligibility criteria for projects that meet stormwater performance measures above and beyond the minimum standards established in §190-79 to read

New development or redevelopment of a site that incorporates a green (vegetated) roof, or other building or site features that are designed so that off-site flow of the first one inch of rainfall during the first 24 hours after rainfall ends is reduced by at least 50 percent shall receive the following benefits:

a. The project may reduce any required building setback by 20 percent (provided the required reduction in off-site water flow is still achieved); and

b. The project may increase the maximum height of any primary building (or part of a primary building) by 10 feet.

## 4.3 Natural Resources

***Goal: Protect the Town's important natural resources such as stream corridors, steep slopes, floodplains, wetlands, and unique ecosystems. Manage development activity to ensure that necessary clearing and site disturbances are minimized and implemented consistent with approvals.***

***Action: Strengthen standards regarding the clearing, grading of land, and replanting in anticipation of development to ensure that such activity conforms to an approved plan.***

### 4.3.1 Watercourse Area Protection Recommendations

**Chapter 190 Article II: Definitions and Abbreviations, §190-6: Definitions.**

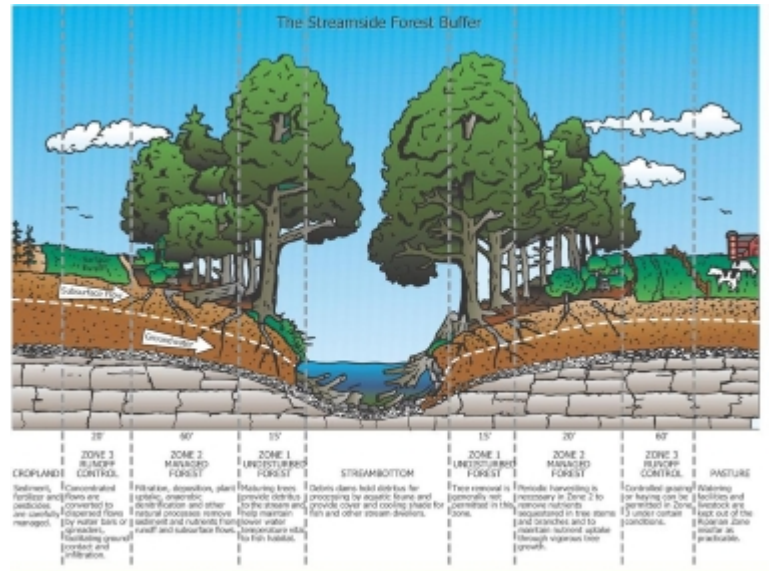
#### **Watercourse Area**

*“An area 100 feet either side of the center line of a watercourse channel and within a radius of 100 feet from the upstream and downstream ends of the watercourse channel center line. Where the watercourse channel is greater than 100 feet in width, the watercourse area shall extend to a distance of 50 feet from each side of the channel.”*

The Town should revise the Watercourse Area calculation to better protect waterbodies from turbidity, sedimentation and erosion from construction activities, clearing or grading. The NYSDEC maintains a

substantial volume of best management practices for protecting stream health. Healthy buffers that can withstand flooding and provide the highest level of protection for streams consist of multiple zones.

- **Zone 1:** The area closest to the stream or waterbody should be planted with native species of water-tolerant trees and large shrubs with little or no harvesting. This zone provides streambank stabilization and provides leaf litter inputs to the stream. Leaf litter is eaten by macroinvertebrates in the stream, which are in turn eaten by fish. When trees grow in Zone 1, they shade the stream, which cools the water and provides better conditions for brook trout or other cold water-dependent fish species. Ideally, Zone 1 should be at least 15 feet wide.
- **Zone 2:** The zone upland from Zone 1 should be planted with native faster growing, smaller, shade-tolerant tree or shrub species. This zone allows water runoff to be absorbed and held in the soil. Nutrients and other pollutants are also filtered by the soil. Faster growing plants are able to uptake and store nutrients in their woody biomass. Zone 2 can range from 20 to 60 feet in width.
- **Zone 3:** The zone farthest from the stream and next to land use areas (for example, houses, crops or pastureland), should be planted with native grasses, wildflowers, or other herbaceous plants. These plants slow fast-moving water runoff and filter sediment. Zone 3 can range from 15 to 60 feet in width.



**FIGURE 1 - STREAM BUFFERS (PHOTO CREDIT: STROUD WATER RESEARCH CENTER)**

NYSDOS, in guidance material for communities to assess flood risk and ways to mitigate flooding risk, also provides recommended buffer widths.

Recommended Minimum Buffer Width for Common Stream Management Objectives <sup>47</sup>	
Purpose of Buffer	Minimum Width of Buffer
Bank Stabilization	98 - 164 feet
Retain Nitrogen and Phosphorous to Protect Water Quality	16 – 295 feet
Prevent Erosion (Sediment Input)	32 – 393 feet
Wildlife Habitat	98 feet – 5249 feet
Flood mitigation	65 – 492 feet

Figure 2 - Wetland and Watercourse Protection Measures (NYSDOS, 2019)

NYSDEC recommends the total width for all three zones is at least 100 feet. Riparian buffers that are at least 100 feet wide provide the minimum protection for water quality and stream protection.



In effort to protect streams, ponds, wetlands, and shorelines from development impacts through imposition of buffers the Town **should define the watercourse area as a minimum horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse.** The town should adopt language that allows the planning board to increase this minimum distance in consideration of site-specific soil conditions, existing water quality of the subject watercourse or other pertinent factors such as conservation value.

**Chapter 190, Article XIV Watercourse Area Management, §190-89 Prohibited activities**

*“The following activities are expressly prohibited in the designated protected watercourse areas of the Town of Colonie:*

*A. Removal of vegetation, except for the reasonable upkeep or preservation of the property or as otherwise provided herein.”*

The removal of vegetation, “except for the reasonable upkeep or preservation of the property” gives a wide latitude for clear cutting and destroying valuable plants that maintain soils and provide for critical habitat. The town should consider wholly prohibiting *any* removal of native vegetation or allowing such removal under permit only – in which case an applicant must seek approval from the Town the ability to remove vegetation. In that circumstance, the town could require landscape plan that includes replacement, native plantings, as well a statement demonstrating the slopes of the waterbody’s banks will not be subject to erosion as a result of the removal of native plants.

The Town should amend sections “F” and “H” of the watercourse prohibitions to take into consideration the revised buffer requirements and consider the following language:

“F: Encroachments by such structures, 200 square feet or less in total area per lot, shall be permitted if not nearer than the minimum horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse.”

“H: Construction of streets, driveways or walkways other than those specified in this article; parking areas; patios or other such surfaces greater than 200 square feet in total ground surface area per lot, except for replacement in kind of an existing facility. Encroachments by such surfaces, 200 square feet or less in total area per lot, shall be permitted if not nearer than the minimum horizontal distance of 100 feet away from and parallel to the high-water level or top of bank (whichever is easiest to accurately determine) of a watercourse.”

**4.3.2 Steep Slopes Requirements**

**Chapter 190 Article II: Definitions and Abbreviations, §190-6: Definitions.**

**Constrained Land**

*“Includes state- and federally-regulated wetlands, protected watercourse areas, federally-designated flood hazard areas, and slopes over 25% which include 2,000 square feet or more of contiguous sloped area.”*

The Town’s definition for “Constrained Land” includes “slopes over 25% which include 2,000 square feet or more of contiguous sloped area.” The town does not define steep slopes aside from the limits in the constrained land definition.

### 4.3.3 Steep Slopes Protection Recommendations

Per the NYSDEC Fact Sheet for the SPDES General Permit for Stormwater Discharges for Construction Activity ([https://www.dec.ny.gov/docs/water\\_pdf/constgpfactsheet.pdf](https://www.dec.ny.gov/docs/water_pdf/constgpfactsheet.pdf)) “Construction on steep slopes (greater than 15%) can result in adverse impacts including land slippage, erosion, changes to stormwater runoff quantity and location, visual impacts, and safety issues for vehicular access. Upstream and downstream habitats and resources can be affected by erosion and sedimentation.”

The town should consider defining **steep slopes** as slopes over 15% which include 2,000 of because of contiguous sloped area,” referring to the NYSDEC consideration of steep slope values, as the potential for negative adverse impacts including land slippage, erosion, changes to stormwater runoff quantity and location should be under greater scrutiny. Upstream and downstream habitats and resources can also be affected by erosion and sedimentation.

The Town should consider amending §190-6’s definition of “BUFFER AREA” to increase the adoption of Green Infrastructure practices and remove any barriers to its employment withing the barrier, as GI practices may often be “structures” that would otherwise be prohibited by code. The town should consider language that allows for the siting of GI practices within the buffer. *“Open spaces, landscaped areas, fences, walls, berms or any combination thereof used to physically separate or screen a use or property from another so as to visually shield or block noise, lights or other nuisances. **This buffer may be used for green infrastructure practices that manage stormwater provided those practices meet setback requirements established elsewhere in Town Code.**”*

The Town should also amend the standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by locating development away from ecologically sensitive areas, permeable soils and limiting the amount of clearing and grading to reduce the potential for erosion and protect sensitive habitats.

- a. Grading on slopes equal to or greater than 15% should be avoided to the maximum extent practicable.
- b. Redevelopment of previously developed sites containing grades equal to or greater than 15% should be limited to the areas of the site currently covered by impervious surfaces. Grading on the remainder of the site with slopes equal to or greater than 15% should be avoided to the maximum extent practicable.
- c. Locating stormwater management control devices within the 100-year floodplain is strongly discouraged and should only be approved if there are no other practicable alternatives.
- d. New development should not be located on highly erodible soils or clay soils prone to slippage, unless supported by a report from a geotechnical engineer attesting to the suitability of the soils for construction and the limitation of potential erosion.
- e. Erodible soils are those soils with an erosion factor (K or Kw) of 0.43 or greater as determined by the most recent Natural Resources Conservation Service survey data.

For specific green infrastructure practices the town may wish to see employed in its implementation of a Green Area Ratio/Green Factor (Section 7), the Town should define each practice and performance measures in the same manner Seattle and Washington, DC have done.

## 4.4 Land Conservation

*Goal: Conserve a Town-wide network of open lands including, but not limited to, viable farmland, wildlife habitat, special or unique environmental resources and potential trail corridors, river access, and recreation areas.*

*Action: Continue to support the preservation of existing, and the development of new wildlife corridors in Town.*

#### 4.4.1 Locating Sites in Less Sensitive Areas/Clearing & Grading Recommendations

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by locating development away from ecologically sensitive areas, permeable soils and limiting the amount of clearing and grading to reduce the potential for erosion and protect sensitive habitats.

Applicants are encouraged to incorporate the principles of Low Impact Development, Better Site Design and other Green Infrastructure measures to meet these goals and meet the requirements of the most recent New York State Stormwater Management Design Manual. The redevelopment of properties that are part of a government approved plan for the clean-up of contaminated properties may be permitted to have larger areas of impervious surfaces where impermeable cover is a requirement of an approved remediation and redevelopment plan.

This language can be applied to subdivision and zoning laws. While the language below is drafted for site plan review, it can also be applied to the review of subdivision plats.

##### **Minimum Action Level**

###### **Site Plans Contents**

- a. An application for site plan approval shall include a soil protection plan which identifies the areas of the various soil types on the property, hydrologic soil groups and soil erosion factors. The plan shall identify construction staging areas and soil disturbance areas. To the extent practicable construction staging areas should be limited to previously disturbed areas or areas with compacted or poorly infiltrating soils.
- b. Site plans must include:
  - i. all watercourses and water bodies, including classification information if available.
  - ii. unique geological features
  - iii. State and federally designated wetlands and the 100' adjacent area for NYS regulated wetlands.
  - iv. locations of significant natural communities (including endangered, threatened or rare plant species; high quality forested areas)
  - v. Slopes equal to or greater than 15%.
  - vi. 100-year floodplains.
  - vii. A grading plan.
  - viii. A tree conservation plan identifying all existing trees 12" diameter at breast height (dbh) or greater and identifying the extent of tree clearing and preservation measures.
- c. Site Plan Review Standards

In its review of a site plan application, the Planning Board shall consider whether the applicant has avoided or minimized impacts to sensitive areas (including wetlands, floodplains, sensitive soils and tree preservation) to the maximum extent practicable consistent with the project goals.

##### **Best Management Action Level** (all of the Minimum Actions plus the following)

- f. New impervious surfaces shall not be located on hydrologic soil groups A or B unless there are no other practicable alternatives.
- g. All construction activities, including staging areas, shall be shown on the site plan, be delineated in the field prior to commencing construction and be limited to the following areas:
  - i. Within 40 feet of the building perimeter.
  - ii. Within 10 feet of surface walkways, patios, surface parking and utilities with a diameter of 12 inches or less.
  - iii. Within 15 feet of road curbs and main trenches for utilities with a diameter of greater than 12 inches.
  - iv. Within 25 feet of areas constructed with pervious surfaces (including pervious paving materials, stormwater management facilities and playing fields).
- h. Unless specifically approved by the Planning Board, vegetation beyond the disturbance areas set forth in Sec. 2.2(f) shall not be cleared or disturbed and all vegetation within the disturbance areas shall be replaced upon completion of construction.
- i. Construction staging areas and vehicular travel areas shall not be located underneath tree canopies. Trees identified on the site plan for preservation shall be marked in the field and their tree canopy area delineated.
- j. All vegetation, with the exception of invasive species, shall be maintained on all slopes equal to or greater than 15% and for all areas within 50 feet of watercourses and drainage swales.
- k. Constructed or graded slopes may not have a slope greater than 3:1 unless an engineering report and soil stability analysis is provided that demonstrates a slope with a steeper grade has a safety factor of at least 1.5 for static loads and 1.1 for pseudostatic loads.
- l. No clearing, excavation, stockpiling of materials or placement of fill shall occur on the slide block of unstable slopes or other unstable soil areas unless approved by the Planning Board upon a demonstration that the proposed activity will not increase the load, drainage, or erosion on the slope or increase the risk of damage to people, adjacent properties or natural resources.

**Model Community Action Level** (all of the Best Actions plus the following)

**Site Plan Review Standards.**

- a. Proposed paved surfaces on previously undeveloped soils within Hydrologic Soil Group A shall be constructed so at least 90% of the surface is comprised of pervious materials (including porous concrete, porous asphalt, structural pavers and structural grass or equivalent materials), unless the applicant can demonstrate with an engineering report that the pervious materials present a threat to public health or safety.
- b. New buildings proposed on Hydrologic Soil Group A shall have a maximum footprint of 4,500 feet of continuous impervious surface, excepting covered pedestrian walkways with a maximum covered width of 10 feet. Building footprint area consisting of an approved Green Roof or decompacted courtyards or walkways shall be considered pervious surfaces and shall not be calculated as included in the 4,500 maximum area.
- c. Proposed paved surfaces on previously undeveloped soils within Hydrologic Soil Group B shall be constructed so at least 80% of the surface is comprised of pervious materials (including porous concrete, porous asphalt, structural pavers and structural grass or equivalent materials), unless the applicant can demonstrate with an engineering report that the pervious materials present a threat to public health or safety.

## 4.5 Natural Resource Buffer Recommendations

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by establishing healthy buffers between development and natural areas to maintain community character, manage stormwater without the use of man-made controls, protect sensitive ecological area, maintain resiliency and encourage the reduction of greenhouse gasses. This language can be applied to subdivision and zoning laws. While the language below is drafted for site plan review, it can also be applied to the review of subdivision plats.

- a. Except as otherwise provided herein, natural area buffers shall be maintained in their natural state adjacent to watercourses, wetlands and areas shown on the site plan containing sensitive plant species.
- b. Minimum buffer areas shall be as follows and may be extended by the Planning Board in appropriate instances where topography requires a greater buffer to provide a level of protection equivalent to the distances set forth herein:
  - i. 100 feet from the boundary of any state or federally designated wetland.
  - ii. 100 feet from the top of bank of any perennial watercourse.
  - iii. 50 feet from the top of bank of an intermittent watercourse.
  - iv. 50 feet from the boundary of areas containing sensitive plant species.

c. **Buffer Averaging.** The Planning Board may alter the buffer requirements and approve an average buffer upon a demonstration that a uniform buffer will result in extraordinary hardship to the applicant due to the unique characteristics of the subject property or the character of the buffer area varies in slope, soil types or vegetation and the resource being protected would benefit from a wider buffer in certain areas and would not be adversely impacted by a narrower buffer in other areas. To be approved an averaged buffer area shall meet the following conditions:

- i. The applicant shall demonstrate that averaging shall not adversely impact the functions and values of the protected watercourses, wetlands and sensitive habitat areas.
- ii. The total area contained within the buffer after averaging shall not be less than the area that would be contained in the buffer without averaging.
- iii. To the extent practicable, lower intensity land uses which are less likely to introduce pollutants or activity in the protected areas shall be located near the narrower buffer widths and higher intensity uses, (such as parking lots) shall be located adjacent to the widest buffer areas.

d. Except as otherwise provided herein and as approved by the Planning Board, buffer areas shall be left undisturbed. Buffer areas shall be shown on the site plan or a survey filed with the County Clerk and the restrictions on the use of the buffer set forth herein shall be included in a deed restriction filed with the County Clerk. The delineation of the buffer areas shall be demarcated on site both during and after construction.

e. **Allowable Buffer Area Uses.**

- i. The 25 feet of the buffer area closest to the protected resource shall be left undisturbed unless a clearing plan is approved by the Planning Board to create a view corridor.
- ii. Within the 25 feet the Planning Board may approve construction of boardwalks to a watercourse or waterbody, footpaths parallel to the watercourse, stormwater management measures and road and utility crossings.

- iii. Within the balance of the buffer area the Planning Board may approve the placement of constructed wetlands, hiking trails and bicycle paths constructed of pervious materials.

f. Prohibited Buffer Area Uses and Activities. Unless specifically approved by the Planning Board pursuant to subparagraph (g), buffer areas shall remain undisturbed without any clearing, grading, construction or be used for the storage or stockpiling of any materials including sand, gravel or snow accumulated from snowplowing. There shall be no application of herbicides, pesticides or fertilizers in the buffer area. Where any government regulation, except for this zoning code, establishes separation distances for the regulated activity, such distance shall be measured from the outer edge of the buffer area

## 4.6 Infrastructure

*Goal: Continue to maintain and enhance the Town's extensive water, sewer, and local roadway infrastructure....Consider adaptation strategies to ensure the resiliency of the Town's infrastructure in response to a changing climate.*

*Action: Implement the next 5-year paving plan in 2020 and continue long-term plans for Latham Water and Pure Waters.*

### 4.6.1 Infrastructure and Subdivision Recommendations

CDRPC recommends adding the following to Chapter 190 Article II: Definitions and Abbreviations

#### **CONSTRUCTION ACTIVITY**

“Activities requiring authorization under the SPDES permit for stormwater discharges from construction activity, GP-02-01, as amended or revised. These activities include construction projects resulting in land disturbance of one or more acres. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.”

### 4.6.2 Vegetated Open Channels Recommendations

*The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by using vegetated open channels in the rights of way of streets to convey and treat stormwater runoff. The redevelopment of properties that are part of a government approved plan for the clean-up of contaminated properties may be permitted to have larger areas of impervious surfaces where impermeable cover is a requirement of an approved remediation and redevelopment plan.*

*This language can be applied to subdivision, zoning and local road laws that provide design requirements for developments, roads and driveways.*

#### **Minimum Action Level**

- a. *New Developments and Redevelopment of Previously Developed Properties. For subdivision and site plan approval. Concrete or paved gutters should not be used in any stormwater conveyance measure unless site conditions significantly restrict the ability to use engineered vegetated swales or bioretention methods. Vegetated swales and bioretention measures shall be placed between roads and sidewalks, if sidewalks are proposed, and*

shall be designed to include safe emergency overflow provisions for large storm events. Whenever vegetated swales and bioretention measures are utilized, provision shall be made for access to the areas for maintenance of the swales and bioretention measures, including if necessary, agreements with adjacent property owners to allow equipment to access the stormwater measures for maintenance activities.

- b. *Improvement of (Town, Village or City) Roads For local road laws. When a new (town, village or city) road is being designed or an existing town road is reconstructed, and sufficient space is available in the right-of-way and appropriate soil conditions are present, vegetated swales or bioretention methods should be used for stormwater conveyance and treatment and shall be designed to include safe emergency overflow events for large storm events. Concrete or paved gutters should not be used unless there are no practicable alternatives.*

***Best Management Action Level*** (all of the Best Actions plus the following)

- a. *New Developments and Redevelopment of Previously Developed Properties For subdivision and site plan approval. Curbing shall not be included along any roads or driveways which may interfere with stormwater flows unless it is demonstrated that such curbs are necessary for engineering or safety reasons.*
- b. *Improvement of (Town, Village or City) Roads For local road laws. When a new (town, village or city) road is being designed or an existing (town, village or city) road is reconstructed, curbing shall not be included along any roads which may interfere with stormwater flows unless it is demonstrated that such curbs are necessary for engineering or safety reasons.*

***Model Community Action Level*** (all of the Best Actions plus the following)

- a. *All curbs adjacent to stormwater management areas (including green infrastructure) shall include curb cuts or other means to direct stormwater towards the stormwater management areas.*
- b. *Green infrastructure stormwater treatment devices shall be designed in accordance with the most recent New York State Stormwater Management Design Manual and may include bioretention, tree pits, vegetated swales, dry swales, wet swales or sunken stormwater planters.*

The Town may approve alternatives to the features listed in subsection (A) above if it determines that the alternative features would achieve the same or greater detention or infiltration of stormwater.

### 4.6.3 Stormwater Control and Site Plan Recommendations

NYS requires the owner or operator of a construction project that will involve soil disturbance of one or more acres to obtain coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity before commencing construction activity.

The Town stormwater law states “No approval of a land development activity shall be issued until a stormwater pollution prevention plan (SWPPP) has been accepted.” The Town defines a land development activity as “An activity, including clearing, grading, excavating, soil disturbance or placement of fill, that results in land disturbance equal to or greater than one acre or an activity disturbing less than one acre of total land area that is part of a larger common plan of development or sale, even though multiple separate and distinct land development activities may take place at different times on different schedules. The

Town applies this standard to land development projects – those that meet or exceed the 1 acre threshold.

For areas of the town with appropriate soils, areas withing or adjacent top sensitive ecological features such as Pine Bush habitat, areas that experience frequent flooding or drainage problems, the town should consider creating a stormwater control overlay district that requires development with disturbance larger than ½ acre to provide a stormwater pollution prevention plan (SWPPP).

It may also with the require, in these same areas. That land development activities smaller than ½ an acre, but larger than ¼ acre, implement Green Infrastructure practices on site, without the requirement of a SWPPP. For projects within this threshold, the Town could require the installation of at least one of the following site design features to reduce stormwater flows.

- A. Install one of the following, designed to detain the first one (1) inch of rainfall and design the site to direct all rooftop stormwater and at least 75% of surface stormwater flows into that site feature, provided the feature is designed to the standard established in the New York State Stormwater Management Design Manual:
  - 1. A tree in a tree well.
  - 2. A drainage swale or rain garden.
  - 3. An underground cistern.
- B. Install a green roof

#### 4.6.4 Reference and Guidance Recommendations

The NYSDEC has identified a set of 18 "better site design practices" ([www.dec.ny.gov/docs/water\\_pdf/bsdcomplete.pdf](http://www.dec.ny.gov/docs/water_pdf/bsdcomplete.pdf)) which can reduce the impacts of a project, and also often reduce costs. Many of these practices will result in smaller required stormwater treatment and storage volumes. These are generally nonstructural or smaller-scale practices than those described in the Stormwater Design Manual (<https://www.dec.ny.gov/chemical/29072.html>) A companion document, "MAINTENANCE GUIDANCE for Stormwater Management Practices" ([https://www.dec.ny.gov/docs/water\\_pdf/smpmaintguidance.pdf](https://www.dec.ny.gov/docs/water_pdf/smpmaintguidance.pdf)). Each of these guidance documents should be available through the town website, referred to on relevant development and permit applications, and encouraged reading for any entity undertaking a land development activity,

The Capital District Regional Planning Commission also maintains a Green Infrastructure Design Toolkit that may be relied upon for development of Green Infrastructure practices for Stormwater Management. This guidance document is available at [www.cdrpc.org/programs/water-quality/green-infrastructure-toolkit](http://www.cdrpc.org/programs/water-quality/green-infrastructure-toolkit)

An "invasive species" is a species that is non-native to the ecosystem under consideration; and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. NYSDEC publishes regulations to help control invasive species by reducing their introduction and spread. The agency published a guidebook, "New York State Prohibited and Regulated Invasive Plants" that should be provided by the town to prospective developers in advance of them submitting sit plans to the Town for review. That Guidebook can be accessed at [https://www.dec.ny.gov/docs/lands\\_forests\\_pdf/isprohibitedplants2.pdf](https://www.dec.ny.gov/docs/lands_forests_pdf/isprohibitedplants2.pdf)

These guides should be referenced in code as a tool for developers and landscape designers to refer to when planning a site.



Several Towns and Villages in region have adopted Landscape Manuals to guide and define the landscaping aesthetic the community prescribes for developments. Examples include the “[Town of Glenville Design Manual](https://www.townofglenville.org/economic-development-planning-department/pages/manuals-design-landscape)” (<https://www.townofglenville.org/economic-development-planning-department/pages/manuals-design-landscape>) and the “[Village of Colonie Design Guidelines](https://www.cdtcmpo.org/link/colonie.pdf)” (<https://www.cdtcmpo.org/link/colonie.pdf>). The town should consider drafting a landscape manual to better prescribe the selection of plantings they wish to see implemented throughout the town. A landscape manual is essential to successful roll-out of any “Green Area Ratio” type of landscaping requirement (see section 6 of this report).

## 4.7 Streets and Sidewalks

***Goal: Continue to maintain and enhance the Town’s extensive water, sewer, and local roadway infrastructure.... Consider adaptation strategies to ensure the resiliency of the Town’s infrastructure in response to a changing climate.***

### 4.7.1 Article XII §190-Chapter 190-61: Streets and Sidewalks

#### **§ 190-61 (B)(9)(a)[25][Z]**

*A minimum of three trees of 2 1/2 inches minimum caliper (deciduous trees) or six feet minimum height (evergreen trees) shall be preserved or planted in each cul-de-sac island. Trees shall be shallow-rooted and be located a minimum of five feet from any pipeline.*

#### **§ 162-13 Requirements for dedication.**

*(14) Local residential streets approved to have one end permanently closed shall have at the closed end a cul-de-sac having a minimum radius for the outside property line of at least 60 feet. Said cul-de-sac shall comply with the Highway and Drainage Standards.*

*(15) Commercial or feeder streets approved to have one end permanently closed shall have at the closed end a cul-de-sac having a minimum radius of at least 70 feet. Said cul-de-sac shall comply with the Highway and Drainage Standards.*

*(16) When the construction of a new street results in the extension of an existing street having a cul-de-sac, the developer shall submit a plan for the removal of said cul-de-sac and the reestablishment of lawn and driveway to existing properties. Approval of the removal of a cul-de-sac shall be part of the street approval, and the actual performance of said work shall be completed prior to the dedication of said street.*

### 4.7.2 Cul-de-Sac Design Recommendations

The standards and requirements of this law are intended to reduce the impact on the environment and protect water quality by limiting the amount of impervious areas, protecting natural resources and maintaining natural hydrological conditions. This law is intended to comply with the New York State.

Cul-de-Sacs may be proposed as part of residential subdivisions or commercial developments with internal roads. Cul-de-sacs have the potential for the greatest impact on stormwater quality compared to alternative road layouts and should be discouraged where it is practical to do so. Where they are

determined to be necessary or desired, they should be designed to minimize width an amount of impervious materials to protect water quality.

These sections may be used to amend local subdivision, zoning or road laws that govern the creation of new public or private roads.

### **Minimum Action Level**

- a. Internal roads proposed for new residential subdivisions or commercial development shall be designed in a manner that facilitates the connection with existing roads or for connection with future roads on adjacent undeveloped or underdeveloped properties.
- b. Where internal roads terminate in a dead end, cul-de-sacs shall only be used where other design options such as hammerheads, loop roads or boulevards are not reasonably practical or feasible. Where an applicant proposes a cul-de-sac in lieu of alternative designs, the application must include an engineering analysis demonstrating why the alternative designs are not reasonably practical or feasible.
- c. The outside turning radius of cul-de-sac may not exceed 35 unless determined necessary and recommended by the Town Highway Superintendent. The maximum allowable outside turning radius is 45 feet and may only be approved if determined necessary for emergency vehicles and large school buses.
- d. For all cul-de-sacs with an outside turning radius greater than 35 feet, all sidewalks adjacent to the cul-de-sac shall be constructed of pervious materials and all driveways connected to the cul-de-sac shall either be constructed of pervious materials or be a two-track design. Where a radius greater than 35 feet is required for emergency vehicles or school buses, the Planning Board may waive the requirement for pervious sidewalks and driveways.
- e. The paved width of the road in the cul-de-sac shall be the equivalent of one-half of the design standards for a local town road excepting shoulder areas.
- f. Internal roads shall be designed to accommodate snow storage areas within permeable medians and the centers of cul-de-sacs.

### **Best Management Action Level** (all of the Minimum Actions plus the following)

- a. Centers of cul-de-sacs shall be designed to promote stormwater infiltration and should not be curbed or raised in a manner that prevents stormwater from draining into the center.
- b. Unless there are no reasonably practical or feasible alternatives, utilities shall not be located in the center of cul-de-sacs so that such areas can maximize green space.
- c. Centers of cul-de-sacs shall consist of pervious surfaces including pervious pavement, porous pavers, grass, structural grass to accommodate emergency vehicles and trucks, lowgrowing bioretention areas, rain gardens, trees or other permeable stormwater treatment measure approved as part of a stormwater pollution prevention plan. Stormwater control measures in the centers of cul-de-sacs must be located on underlying soils with an infiltration rate of at least 0.5 inches/hour at a depth as required by the current version of the New York State Stormwater Management Design Manual.
- d. If a loop road or boulevard is used the medians of such roads shall be maintained with native

- e. vegetation or green infrastructure stormwater management practices and may be used as passive or active recreational areas.

### 4.7.3 Sidewalks and Curb Requirements

It is not clear if the town has curb, sidewalk or permeable strip requirements that pertain to width or slope for drainage purposes.

### 4.7.4 Sidewalk Recommendations

#### ***Minimum Action Level***

- a. Sidewalks should have a maximum width of 5 feet unless local conditions or high pedestrian volumes warrant a wider sidewalk.
- b. Sidewalks shall be graded such that they drain to the front yards except in areas where the introduction of additional groundwater may be undesirable (building foundations, Hydrologic Soil Group C or D soils) or determined to be physically impracticable.

#### ***Best Management Action Level*** (all of the Minimum Actions plus the following).

- c. Sidewalks constructed in accordance with the Americans with Disabilities Act (ADA) utilizing compliant porous pavement or alternative porous surface are encouraged. Permeable sidewalks are strongly encouraged and may be required in lieu of impermeable sidewalks where soils are within Hydrologic Soil Group A or B, unless determined to be physically infeasible or waived due to verified safety concerns supported by engineering analysis

### 4.7.5 Curb Design Recommendations

- a. Curbs along roads, parking lots and driveways shall include curb cuts to allow for diversion into green infrastructure practices, including stormwater planters, bioretention
- b. areas, tree pits and filter strips. Curb cuts should incorporate trash racks to prevent trash from entering the green infrastructure measures.
- c. Curb bump-outs with overflows to divert stormwater to a conventional stormwater system may be used in certain circumstances. Curb bump-outs are encouraged in lieu of catch basins in residential districts where soils are within Hydrologic Soil Group A or B.
- d. Curb bump-outs may be placed in locations where catch basins would otherwise be constructed, and also serve as a traffic calming measure, and crosswalk length reduction. Curb bump-outs/curb extensions shall be designed in accordance with the New York
- e. State Stormwater Management Design Manual's requirements and guidance for Stormwater Planters.
- f. A curb bump-out is a vegetated curb extension that protrudes into the street either midblock or at an intersection, creating a widening of the permeable strip between the sidewalk and the road or parking lot and a narrowing of the road. A bumpout is composed of a layer of stone that is topped with soil and plants. An inlet or curb-cut directs runoff into the bumpout structure where it can be stored, infiltrated, and taken up by the plants.

## 4.7.6 Design and Maintenance of Permeable Strips Recommendations

- a. *A continuous permeable strip shall be located between the sidewalk and the curbside or edge of pavement. The permeable strip shall be 3 feet wide or 1/3 the width of the sidewalk, whichever is greater and shall extend for the length of the sidewalk.*
- b. *Permeable strips between sidewalks and roads and parking lots may be utilized as linear bioretention areas with curb cuts that divert the stormwater into the bioretention areas. In addition to the requirements included in the section, the bioretention area must be designed in accordance with the New York State Stormwater Design Manual. If the bioretention area is part of an approved SWPP and the area is not conveyed to the [municipality] a maintenance plan for the bioretention area must be included with the application.*
- c. *The [site plan or subdivision application] shall include a paving plan that shows all existing and proposed trees and their species in the area of the permeable strip.*
- d. *Trees to be planted in the permeable strip shall be planted either individually or in groups with a minimum separation distance of 30 feet on center and a maximum separation distance of 75 feet on center. Selected trees shall be noninvasive and have an upright branching pattern with a minimum vertical clearance of 8 feet to the lowest branches at the time of planting. These requirements may be modified to comply with the requirements of other regulatory agencies.*
- e. *For non-planted permeable strips, the surface material shall be permeable based on NYSDOT material options applicable to the intended use and neighborhood. Design shall be such that the surface is not subject to frost heave conditions damaging the structure of the strip.*
- f. *When backfill is proposed beyond the planting zone within the permeable strip, the backfill shall be structural soil with a depth no less than 24 inches from finished grade.*
- g. *The use of recycled concrete aggregate shall not be permitted as backfill.*
- h. *For planted permeable strips turf grass is prohibited. Plants shall consist of native meadow plantings, low herbaceous plants or no-mow ground covers, except that street trees within the planting strip shall have a 3 foot diameter/square mulch bed at their base.*
- i. *Meadow or other grasses shall be mowed at least once per year except for:*
  1. *Sidewalk zones where the distance between the curb and the lot line is less than 9 feet wide.*
  2. *Areas within curb cuts.*
  3. *Areas with subgrade structures that could be adversely impacted by mowing.*
  4. *Historic sidewalks.*
5. *Areas incorporating large rocks or rock outcroppings that make mowing impracticable.*

## 5.0 The Green Area Ratio

CDRPC staff has researched the use of Green Area Ratio as a landscape and site design tool to help reduce stormwater runoff, improve air quality, and maintain green space. CDRPC has reviewed the purpose and effectiveness of a Green Area Ratio, identified best practices and identified model ordinances. This section of the report outlines what the Green Area Ratio Program is, how it works, its benefits, limitations and enabling legislation/the mechanism for its employment. Also provided is a summary of

recommended steps and promotional materials necessary for successful deployment of this revolutionary new tool.

## 5.1 What is the Green Area Ratio?

The Green Area Ratio (GAR) (or Green Factor) is a zoning regulation that integrates landscape elements into parcel site design to promote sustainable and aesthetically-pleasing development. This score is based on an assessment of the square footage of landscape elements that can be incorporated with each type of land use and relates to an increase in the quantity and quality of environmental performance of the urban landscape. GAR sets integrated environmental requirements for landscape elements and site design that contribute to the reduction of stormwater runoff, the improvement of air quality, and the mitigation of the urban heat island effect.

The purposes of the GAR regulations are to implement a value-based system of requirements for environmental site design that provides flexibility in meeting environmental performance standards and promotes attractive and environmentally functional landscapes. The Green Area Ratio concept began in 1997 and was first employed in Berlin, Germany. Since its implementation in Berlin, the GAR has been adopted in Sweden and South Korea. Seattle was the first U.S. city to adopt a GAR program, known there as the Seattle Green Factor (SGF). The city describes the SGF as a “score-based code requirement that increases the amount and improves the quality of landscaping in new development.” It aims to manage stormwater runoff, aesthetically enhance neighborhoods, and improve habitat for birds and beneficial insects. Seattle adopted the SGF in 2006 and expanded the program in 2009, with the priorities being livability, ecosystem services, and climate change adaptation. Fife, Washington, a suburb of Tacoma near Seattle, also adopted a green factor as part of a low-impact development ordinance in 2009.

To qualify for permits, development projects in Seattle must achieve a minimum SGF score determined by zoning, with different standards set for commercial and residential properties.

According to the American Society of Landscape Architects, “because SGF significantly raises the bar for landscaping in affected zones, landscape design now starts in the initial stages of site planning, allowing more collaboration between design professionals; the resulting landscapes are more attractive and better integrated into site programs and amenity areas.”

The GAR requires development sites to incorporate strategic sustainable features to reduce storm water runoff, improve air quality and keep the city cooler. For the developer, the ratio provides flexibility, a toolbox of techniques that contribute different levels of environmental benefits – and a system it may perform much better than the sum of assorted parts that could be working together. For example, in planning a traditional site, a developer may remove mature trees that soak up stormwater, replace these



trees with structures, add stormwater control devices, and add landscaping for beautification – ignoring the potential stormwater and aesthetic value of the mature trees and needlessly spending thousands of dollars on extraneous engineered solutions. The GAR also simplifies the process of landscaping and planning stormwater techniques for a site because it assigns “weights” based on a scientifically backed assessment of a practices’ ability to manage environmental impacts and climate adaptations, including urban heat island amelioration, air quality improvement and storm water mitigation. The points are weighted by green infrastructure size, functionality, and aesthetics, with the total divided by the parcel size. The menu may include rain gardens, native landscaping, vegetated walls, green roofs, and food gardens. The system encourages the layered use of different stormwater mechanisms to increase absorption capacity and create rich aesthetics that support how new developments look and function.

## 5.2 Comprehensive Plan Goals and Actions relating to Landscaping and Site Design

The Town’s Comprehensive Plan established the following goals and action.

### *Neighborhood Preservation*

***Goal: Continue to accommodate the provision of a range of housing types in appropriate locations to meet the diverse needs of Colonie’s residents. Provide incentives to encourage affordability, mixed-income developments and multigenerational neighborhoods.***

***Action: Review provisions in zoning to better address the transition from commercial, mixed-use, and higher-density residential zones to adjoining residential neighborhoods. Careful attention to building and site design, including the preservation of existing vegetation, as appropriate, should be incorporated into the project review process.***

### *Commercial and Industrial Development*

***Goal: Focus commercial and industrial growth in existing areas that are designated for these purposes and where infrastructure already existing. Encourage the reuse or redevelopment of existing landscaping.***

## 5.3 Current Landscaping Regulations

### ***Article IX, Design Standards’ § 190-40, 190-41, 190-42, 190-43 and 190-444***

The Town has the following landscaping requirements, which apply across multiple zones. There are currently no landscaping requirements for industrial zones.

*(D) Multifamily residential element design. Design and development standards for stand-alone multifamily residential components in the OR District have been created to develop housing in a way that conserves the desirable characteristics of established neighborhoods, while creating new livable neighborhoods that are well integrated into the adjacent commercial areas.*

*(1) Site planning. New multifamily projects should be an integral part of the neighborhood and the community and create a comfortable and social living environment for residents.*

*(f) Entry drives to multifamily housing should be designed to create a positive identity for the project. Landscape and site design should frame and distinguish entry drives.”*

*(D) “Landscaping for multifamily projects should integrate the projects with the neighborhood and coherently support site and architectural concepts.*

*(1) All site areas not covered by structures, walkways, driveways or parking spaces should be landscaped.*

*(2) Landscaping should support the distinction and transition between private, common and public spaces.*

*(3) Landscape materials should be live plants.*

*(4) Natural features and existing trees should be incorporated into the landscape plan.*

*(5) Plazas and common areas subject to pedestrian traffic may be surfaced with a combination of landscape and decorative pavers or textured concrete.*

*Landscaping requirements shall include the following standards:*

*[1] Canopy/deciduous trees: 2.5 inches in caliper.*

*[2] Small flowering trees: two inches in caliper.*

*[3] Large shrubs: 30 inches in height.*

*“Within this District, the green space percentage is a minimum of 35%. Refer to the incentive zoning provisions of this chapter for green space “credits.” Reduction in green space is intended to be aesthetically balanced and accommodated through quality and design of the open space. Green space should be organized in a meaningful and useful manner and should include one or more parks, squares or community greens where appropriate.”*

*“Screening and buffering. Landscape buffers between residential and commercial areas shall be used to lessen adverse impacts such as noise, fumes and privacy concerns. Acceptable screening techniques include combinations of vegetated landscaping, landscaping walls, fencing (excluding chain link) and earth berming. When residential uses are adjacent to commercial uses, additional screening treatments shall be required. Generally, the buffer shall include a variety of local plant species, including a mix of deciduous and evergreen trees. Parking, services and loading/maneuvering areas should be reasonably landscaped and screened from view of adjacent properties and from within the project site.”*

The current landscaping guidelines leave room for flexibility, but also can lead to an unpleasant uniformity of landscaping practices. For the developer, it may also create a struggle to design a site that satisfies the zoning code for landscaping, but not the planning board expectations for the quality of the landscaping elements. The current regulations also provide limited opportunities to substitute or supplement traditional landscaping elements with green infrastructure elements.

The Town could rely on the Green Area Ratio to radically improve both the aesthetics of a site, and stormwater performance while at the same time managing, and synthesizing, developer and community expectations for good site design.

## 5.4 Benefits of the Green Area Ratio (GAR) / Green Factor (GF)

The Green Area Ratio (and Green Factor, as it's called in Seattle, WA) allows greater flexibility and predictability for the development community to meet the Town's expectations for landscape and green infrastructure controls. It also allows the Town to strategically modify the values of practices to encourage or discourage practices. Through adjustments of the GAR scores, the Town can easily program more landscaping, or higher performance green infrastructure to specific zones. For example, should the Town wish to place a greater emphasis on preservation of existing stands of mature trees, the multiplier for Tree canopy for preservation of existing trees 24 inches in diameter or larger could be increased (using Washington DC's multiplier as an example, the value may be increased from .8 to 1).

### GAR Required by Zone District: Effective September 6, 2016

Zone District	Green Area Ratio
RA-1, RA-2, RA-6, RA-7, RA-8 RC-1; WR-2, WR-3, WR-4, WR-5, WR-7, WR-8	0.40
RA-3, RA-4, RA-5, RA-9, RA-10 MU-1, MU-2, MU-3, MU-4, MU-5, MU-6, MU-12, MU-13, MU-14, MU-15, MU-16, MU-17, MU-18, MU-19, MU-23, MU-24, MU-25, MU-26, MU-27, NC-1, NC-2, NC-3, NC-4, NC-5, NC-7, NC-9, NC-10, NC-11, NC-14, NC-16, NC-17 SEFC-2, SEFC-3, CG-1, CG-2, RC-2, RC-3 ARTS-1, ARTS-2, D-2, CG-5	0.30
MU-7, MU-8, MU-28 NC-6, NC-8, NC-12, NC-13, NC-15, ARTS-3	0.25
MU-9, MU-10, MU-20, MU-21, MU-22, MU-29 D-3, D-4, D-5, D-1-R, D-4-R, D-5-R, D-6, D-6-R, D-7, D-8 SEFC-1, CG-4, ARTS-4, CG-3	0.20
<b>PDR (all lots unless otherwise noted):</b>	0.30
• Lot with principal building that is one (1) story in height	0.10
• Lot with principal building that is two (2) stories in height	0.20

FIGURE 3 - WASHINGTON, DC GAR DISTRICT VALUES

Current code requires landscaping that is likely to fall into a repeated, pattern book approach, which can give the impression of monotonous uniformity from the public while at the same time frustrating designers and the planning board as they attempt to apply a prerequisite pattern to any ill-fitting site with unusual geographic features, lot dimensions, sight lines or hydrologic features. GAR allows the town to emphasize diversity and flexibility – reducing the likelihood of unpleasant uniformity of landscape plans. GAR also allows the developer or site planner more flexibility to design to the site and rely less on code that may unintentionally force ill-fitting or unattractive landscaping. GAR may also save time before planning boards, in which the developer and community may be trapped in loops of site plan changes to fit code that lack clarity on the types of plantings the Town wishes to see.

Washington, DC strategically applies the GAR and enhanced controls between zoning districts, providing a strong emphasis on GAR requirements within residential districts, and relaxed standards applied to commercial and mixed use districts. By contrast, the Town of Colonie's landscaping requirements apply town-wide, although there are some additional requirements specific to multi-family developments. By tying GAR point values to districts, the town could simplify what may otherwise be daunting and confusing disparate landscaping requirements between districts. It may also apply modified GAR values to overlay areas.

## 5.5 Limitations / Challenges to GAR Implementation

The Green Area Ratio requirements do not replace stormwater requirements and cannot replace required post construction stormwater controls for development. The GAR is a landscaping tool, however, GAR does provide an opportunity to further encourage the adoption of Green Infrastructure Practices in the portfolio



of landscape features on a site and it encourages the use of plantings to both provide an aesthetic benefit and manage stormwater on site.

Allowing developers and landscape planners the ability to more creatively approach a landscape plan while providing a clear and legible guide for the value of specific landscape elements the public wishes to employ will be a benefit to the Town, but the Town must be able to ensure these practices are maintained – especially if these practices are part of the site’s stormwater management system. Prudent and cost conscious landscape designers may employ GAR practices to manage stormwater and take advantage of what may be today a ‘double dipping’ for the landscape and stormwater requirements. For the Town, their regulatory staff will need to be keenly aware of how Green Infrastructure practices perform, how they should be maintained, what failure of a practice looks like and what corrective actions to request from a site owner. The NYSDEC published a Maintenance Guide for Stormwater Practices in March 2017 that should be the underpinning of any training staff undertake to monitor and maintain post construction stormwater controls. This guide can be accessed at [https://www.dec.ny.gov/docs/water\\_pdf/smpmaintguidance.pdf](https://www.dec.ny.gov/docs/water_pdf/smpmaintguidance.pdf).

## 5.6 The Nuts and Bolts: How GAR works

Seattle and Washington, DC are the only two communities in the United States employing a point-based landscaping code, the Green Area Ratio. Their programs are fundamentally the same but have slight differences in their approach.

### 5.6.1 Seattle’s “Green Factor”

Seattle, WA was the first community in the United States to adopt The Green Area Ratio. Seattle calls their program “The Green Factor” however, this is simply a difference in nomenclature.

The Seattle Green Factor is a menu of landscaping strategies that is required for all new development in neighborhood business districts with more than four dwelling units, more than 4,000 square feet of commercial uses, or more than 20 new parking spaces. It is intended to increase the amount and quality of urban landscaping in dense urban areas while allowing increased flexibility for developers and designers to efficiently use their properties. Seattle maintains a website for the Green Factor Program at [https://www.seattle.gov/sdci/codes/codes-we-enforce-\(a-z\)/seattle-green-factor](https://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/seattle-green-factor) .

The City maintains a comprehensive set of regulations, tools, presentations, guides and how-to tips at [https://www.seattle.gov/sdci/codes/codes-we-enforce-\(a-z\)/seattle-green-factor](https://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/seattle-green-factor).

Seattle requires Green Factor Landscape plans to be designed by licensed landscape architects, certified professional horticulturalists, or certified landscape designers. The landscape professional for a project must sign all landscape plan sheets submitted with a permit application and must sign the Landscape Improvement Checklist confirming that the project adheres to City requirements and has been installed according to the approved plans.

Any work in the right-of-way requires that the Landscape Architect complete and submit a Construction Phase Checklist for Landscape Professionals. This checklist is found on SDOT’s Urban Forestry Trees and Construction webpage: <http://www.seattle.gov/transportation/projects-and-programs/programs/trees-and-landscaping-program/trees-and-construction>.

Seattle requires the equivalent of 30% of a parcel in the commercial zones to be vegetated by using the Seattle Green Factor. The same percentage the Town requires for Greenspace in most districts. The Green

Factor encourages maximizing the “vegetation potential” of the rights-of-way through planting of layers of vegetation and larger trees in areas visible to the public. There are additional bonuses for rainwater harvesting and/or low water use plantings. Use of larger trees, tree preservation, green roofs, green walls and water features are encouraged by this requirement.

<b>“Table A” Seattle’s Green Factor landscape elements</b>		<b>Multiplier</b>
<b>A. Planted areas (choose one of the following for each planting area)</b>		
1. Planted areas with a soil depth of 24 inches or more:		0.6
2. <a href="#">Bioretention facilities meeting standards of the Stormwater Code, Title 22, Subtitle VIII</a>		1
<b>B. Plants</b>		
1. Mulch, ground covers, or other plants normally expected to be less than 2 feet tall at maturity		0.1
2. Medium shrubs or other perennials at least 2 feet tall, but less than 4 feet tall, at maturity		0.3
3. Large shrubs or other perennials at least 4 feet tall at maturity		0.3
4. Small trees		0.3
5. Small/medium trees		0.5
6. Medium/large trees		0.7
7. Large trees		0.9
8. Preservation of existing trees at least 6 inches in diameter at breast height		1
<b>C. Green roofs</b>		
1. Planted over at least 2 inches but less than 4 inches of growth medium		0.4
2. Planted over at least 4 inches but less than 8 inches of growth medium		0.6
3. Planted over at least 8 inches of growth medium		0.8
D. Vegetated walls in C and NC zones only		0.4
<b>E. Permeable paving</b>		
1. Installed over at least 6 inches and less than 24 inches of soil and/or gravel		0.2
2. Installed over at least 24 inches of soil and/or gravel		0.5
F. Structural soil		0.5
<b>G. Bonuses applied to Green Factor landscape elements:</b>		
1. Landscaping that consists entirely of drought- tolerant or native plant species		0.1
2. Landscaping that receives at least 50% of its irrigation through the use of harvested rainwater		0.2
3. Landscaping visible from adjacent rights-of-way or public open space		0.2
4. Landscaping in food cultivation		0.1

"Table B" Seattle's Equivalent square footage of trees and large shrubs	
Landscape elements	Equivalent sq. ft.
Medium shrubs or other perennials at least 2 feet tall, but less than 4 feet tall, at maturity	9 per plant
Large shrubs or other perennials at least 4 feet tall at maturity	36 per plant
Small trees	75 per tree
Small/medium trees	150 per tree
Medium/large trees	250 per tree
Large trees	350 per tree
Existing trees	20 per inch of trunk diameter 4.5 feet above grade

### 5.6.2 Seattle City Code 23.86.019 – Requirements for Green Factor

*“Development standards for certain areas require landscaping that meets a minimum Green Factor score. All required landscaping shall meet standards promulgated by the Director to provide for the long-term health, viability, and coverage of plantings. These standards may include, but are not limited to, the type and size of plants, spacing of plants, depth, and quality of soil, use of drought-tolerant plants, and access to light and air for plants. The Green Factor score shall be calculated as follows:*

1. *Identify all proposed landscape elements, sorted into the categories presented in Table A for 23.86.019.*
2. *Multiply the square feet, or equivalent square footage where applicable, of each landscape element by the multiplier provided for that element in Table A, according to the following provisions:*
  - a. *If multiple elements listed on Table A occupy the same area (for example, groundcover under a tree), count the full square footage or equivalent square footage of each element.*
  - b. *Landscaping elements in the right-of-way between the lot line and the roadway may be counted, provided that they are approved by the Director of the Department of Transportation.*
  - c. *Elements listed in Table A that are provided to satisfy any other requirements of this Title 23 may be counted.*
  - d. *For trees, large shrubs, and large perennials, use the equivalent square footage of each tree or shrub according to Table B.*
  - e. *For vegetated walls, use the square footage of the portion of the wall covered by vegetation. All vegetated wall structures, including fences counted as vegetated walls, shall be constructed of durable materials, provide adequate planting area for plant health, and provide appropriate surfaces or structures that enable plant coverage.*
  - f. *For all elements other than trees, large shrubs, large perennials, and vegetated walls, square footage is determined by the area of the portion of a horizontal plane that lies over or under the element.*

*g. All permeable paving and structural soil credits together may not count for more than one third of the lot's Green Factor score.*

3. Add together all the products calculated under subsection 23.86.019.A.2 to determine the Green Factor numerator.

4. Divide the Green Factor numerator by the lot area to determine the Green Factor score.

Seattle provides a Green Factor Worksheet, included in this report as Appendix A, for the use of calculating the GF score.

### 5.6.3 Washington, D.C. Green Area Ratio

Washington D.C.'s Green Area Ratio standards are more aggressive than Seattle's and apply to **all new buildings and to all existing buildings where any additions, interior renovations, or both, within any twelve (12) month period exceed one hundred percent (100%) of the assessed value of the building except:**

- C. Single family residences
- D. Buildings that do not require certificates of occupancy;
- E. Municipal wastewater treatment facilities operated by the District of Columbia Water and Sewer Authority;
- F. The interior renovation of an existing building that meets all of the following:
  - i. Is located in the Central Employment Area;
  - ii. Has an existing one hundred percent (100%) lot occupancy prior to the filing of the building permit;
  - iii. Has an existing roof that cannot support a dead load of four inches (4 in.) of growth medium on the roof; and
  - iv. The work proposed by the building permit application will not result in a roof capable of supporting a dead load of four inches (4 in.) of growth medium on the roof; or
- G. A historic resource and any additions thereto

The program includes requirements that may trigger predeveloped sites into coming to compliance. Any approved change or modification to a permit, project or application in that results in an increase in impervious surface or lot occupancy of twenty percent (20%) or more also causes the GAR to be applicable for that portion of a project that is effected by the modification. Cost basis for additions, alterations or repairs to an existing building is the amount indicated by the applicant on the application for a building permit.

Washington, DC's Green Area Resources can be found at <https://doee.dc.gov/service/green-area-ratio-overview>.

The GAR is calculated using the following formula:

$$\text{GAR} = \frac{(\text{area of landscape element 1} \times \text{multiplier}) + (\text{area of landscape element 2} \times \text{multiplier})}{\text{Lot Area}}$$

The term “landscape element” refers to one (1) of the elements listed in the table A, below.

<b>Table A, Washington, DC GAR LANDSCAPE ELEMENTS</b>	<b>MULTIPLIER</b>
Landscape area (select 1 of the following for each area)	
Landscape areas with a soil depth of less than 24 inches	0.3
Landscape areas with a soil depth of 24 inches or more	0.6
Bioretention facilities	0.4
<b>Plantings</b>	
Ground covers, or other plants less than 2 feet tall at maturity	0.2
Plants, not including grasses, at least 2 feet tall at maturity	0.3
Tree canopy for all new trees with mature canopy spread of 40 ft. or less calculated at 50 sq. ft. per tree	0.5
Tree canopy for all new trees with mature canopy spread of greater than 40 ft. calculated at 250 sq. ft. per tree	0.6
Tree canopy for preservation of existing trees 6 inches to 24 inches in diameter	0.7
Tree canopy for preservation of existing trees 24 inches in diameter or larger	0.8
Vegetated wall, plantings on a vertical surface	0.6
<b>Vegetated roofs</b>	
Extensive vegetated roof over at least 2 inches but less than 8 inches of growth medium	0.6
Intensive vegetated roof over at least 8 inches of growth medium	0.8
<b>Permeable paving</b>	
Permeable paving over at least 6 inches and less than 2 feet of soil or gravel	0.4
Permeable paving over at least 2 feet of soil or gravel	0.5
<b>Other</b>	
Enhanced tree growth systems	0.4
Renewable energy generation (area of)	0.5
Water features (using at least 50% recycled water)	0.2
<b>Bonuses</b>	
Native plant species listed in Subtitle C § 603.9	0.1
Landscaping in food cultivation	0.1
Harvested stormwater irrigation	0.1

<b>TABLE B: WASHINGTON DC GAR EQUIVALENT SQUARE FEET OF TREE CANOPY AND LARGE SHRUBS</b>	<b>EQUIVALENT SQ. FT.</b>
Plants, not including grasses, at least 2 feet tall at maturity	9 sq. ft. per plant
Tree canopy for trees 2.5 inches to 6 inches in diameter	50 sq. ft. per tree
Tree canopy for trees 6 inches to 12 inches in diameter	250 sq. ft. per tree
Tree canopy for trees 12 inches to 18 inches in diameter	600 sq. ft. per tree
Tree canopy for trees 18 inches to 24 inches in diameter	1,300 sq. ft. per tree
Tree canopy for trees larger than 24 inches in diameter	2,000 sq. ft. per tree

The process for calculating a property's GAR under the formula is as follows:

- The area of each landscape element is multiplied by its corresponding multiplier; The resulting numbers for all landscape elements are added together; The resulting point total is then divided by the total land area of the lot; and
- The product of the equation equals the property's GAR.
- The total points for all permeable paving and enhanced tree growth credits may not count for more than one-third (1/3) of the GAR score for a lot.

The City has a stronger emphasis on GAR requirements within residential districts, and relaxed standards applied to commercial and mixed use districts. Washington, DC is very prescriptive for its Landscape Practices, definitions which, if also adopted by the Town may help it strategically identify and encourage specific practices.

Washington, DC requires that applicants shall submit a GAR score sheet with the GAR calculated for the given lot at the time of building permit application.

Applicants shall provide a landscape plan prepared by a Certified Landscape Expert that includes the following information:

- GAR elements called out by category and area, which may be provided as a part of the landscape plan or as a separate document;
- Lot dimension and size;
- Location and areas of all landscape elements with dimensions;
- Location, size, and species of all plants used to meet requirements;
- Both common and botanical names of all plant material;
- Identification of all existing trees that are to be preserved, with their location, trunk diameter at four feet, six inches (4 ft. 6 in.) above grade, canopy radius, and species;
- Plans indicating how preserved trees and other plants will be protected during demolition and construction;
- Location and dimensions of wheel stops, curbs, or other devices to protect landscaping for landscaped areas adjacent to driveways;

- A schematic irrigation and drainage plan and the size and depth of all plant containers for rooftop or container landscaping or areas to be irrigated with rainwater;
- Location and size of any trees to be removed;
- Specifications for soil improvement; and
- Signature of the Certified Landscape Expert who prepared the plans together with verification that plantings and other landscape elements

### **Certified Landscape Expert**

- Washington, DC mandates that GAR project applicants must secure a CLE to verify the plans and installation comply with GAR. The CLE who signs the GAR plans may be different from the CLE who signs the Landscape Checklist. The applicant should select a CLE who specializes in the type(s) of landscape elements used in the project.

### **The CLE is defined as any of the following:**

- A Maryland or Virginia Licensed Landscape Architect;
- An International Society of Arboriculture (ISA) Certified Arborist;
- A Maryland Professional Horticulturist; or
- A Landscape Contractors Association, DC-MD-VA Landscape Industry Certified Technician.

### **The CLE must do the following:**

- Sign off on submitted GAR plans to indicate they conform to the GAR regulations and GAR Guidebook;
- Confirm the landscape elements are installed according to the approved plan and then sign off on the Landscape Checklist; and
- Prepare and sign a landscape maintenance plan for the property owner.

Applicants are also required to provide a landscape maintenance plan prepared and signed by a Certified Landscape Expert that describes how the plantings, water features, and hardscape features will be cared for and maintained including:

- Soil preparation;
- Use of compost;
- Plant replacement;
- Irrigation;
- Weed and pest control; and
- Control of noxious or invasive species.

The following modifications or substitutions to the landscape elements of an approved landscape plan require a plan revision and approval:

- Number of trees, shrubs, or groundcovers;
- Location of required plantings or landscape features;
- Substitution of species; or
- Revisions of any feature that could decrease the planting area or lower the GAR score.

Prior to the issuance of the certificate of occupancy, a landscape checklist must be signed by a Certified Landscape Expert, verifying that that landscaping was installed according to the building permit approved by Department of Consumer and Regulatory Affairs.

Payment Type	Payment Requirement	Fees by Combined Area of Land Disturbance and Substantial Improvement Building Footprint	
		≤ 10,000 ft <sup>2</sup>	> 10,000 ft <sup>2</sup>
Initial	Due upon filing for building permit	\$593.55	\$877.43
Final	Due before building permit is issued	\$129.03	\$206.45
Supplemental	For reviews after first resubmission	\$516.13	

FIGURE 4 - WASHINGTON, DC GAR FEE STRUCTURE

Washington, DC places the administrative oversight of the GAR on The Zoning Administrator.

The Administrator may grant a temporary certificate of occupancy when installation of the required landscaping is not currently possible due to weather, season, or site construction subject to the condition that the required landscaping must be installed within four (4) months after the date the temporary certificate is issued. The Zoning Administrator may grant up to two (2) extensions of a temporary certificate of occupancy, each for a four (4) month period.

### 5.7 Recommended GF/GAR Approach

Both Seattle and Washington DC have GF/GAR elements the town should consider adopting.

Seattle’s program, which applies to all new development in neighborhood business districts with more than four dwelling units, more than 4,000 square feet of commercial uses, or more than 20 new parking spaces, well suited for capturing the bulk and scale of commercial projects for which the town’s Comprehensive Plan establishes goals for stormwater, landscaping and community harmony.

Seattle’s GF requires that the Green Factor Landscape areas must be designed by licensed landscape architects, certified professional horticulturalists, or certified landscape designers if the proposed project contains the following which triggers the Green Factor:

- A. 10 or more residential units,
- B. 20 or more new parking spaces,
- C. 12,000 or more gross square feet of commercial or industrial space, or
- D. more than 500 square feet of landscaping in containers.

Washington DC’s GAR program has a more substantial selection of potential practices and detailed definitions of qualifying practices that a developer could rely on for GAR points. The more substantial the options, the higher the likelihood of meeting the GAR requirements. As no two sites are equal, the consideration of GAR/GF points allows a designer the creativity and flexibility to meet both the site’s unique stormwater requirements and satisfy the Town and public expectations for landscaping and aesthetics.



The Washington, DC GAR applies to all new buildings requiring a Certificate of Occupancy and to all existing buildings requiring a Certificate of Occupancy where any additions, alterations, or repairs within any twelve month (12) period exceed one hundred percent (100%) of the assessed value of the building as set forth in the records of the Office of Tax and Revenue as of the date of the building permit application; provided the cost basis for alterations or additions to an existing building shall be the amount indicated by the applicant on the application for a building permit; and the assessed value of the building shall be the value set forth in records of the Office of Tax and Revenue as of the date of the building permit application. This gives DC the ability to ensure that non-GAR-conforming properties in the city, can be brought to current standards.

The Green Area Ratio is a relatively revolutionary method of implementing landscaping and stormwater controls. With only two cities in the United States using it as the basis for guiding landscaping, it may be challenging to navigate the legislative steps needed and the public education to establish the program. However, both Seattle and Washington, DC, have established excellent resources that can be relied upon for the Town to develop their own enabling legislation, public education, website and presentation content and resources for developers and landscape planner – similar to the resources the District has established at <https://doee.dc.gov/service/green-area-ratio-overview>

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## 7.0 Special Thanks

**Many thanks to the following individuals for their assistance in assembling this report:**

Monique Wahba, Senior Planner, Town of Colonie

Kristopher Williams, Invasive Species Coordinator, Capital Region PRISM (Partnership for Regional Invasive Species Management)

Nancy Heinzen, Program Coordinator/Coalition Director, Stormwater Coalition of Albany County

Blue Neils, Program Coordinator/Coalition Director, Stormwater Coalition of Saratoga County

# Appendix A

## Green Factor Tool



Project title:		Enter sq ft of parcel		SCORE	#DIV/0!
		Parcel size	0		
Landscape Elements**		Totals calculate automatically from Green Factor Worksheet		Factor	Total
<b>A</b>	<b>Planted areas</b>		0	0.6	0
1	Planted areas with a soil depth of 24" or greater		square feet		
2	Bioretention facilities		0	1	0
			square feet		
<b>B</b>	<b>Plantings (credit for plants in landscaped areas from Section A)</b>				
1	Mulch, ground covers, or other plants less than 2' tall at maturity		0	0.1	0
			square feet		
2	Medium shrubs or perennials 2'-4' tall maturity - calculated at 9 sq ft per plant (typically planted no closer than 18" on center)	0	0	0.3	0
		plants			
3	Large shrubs or perennials 4'+ at maturity - calculated at 36 sq ft per plant (typically planted no closer than 24" on center)	0	0	0.3	0
		plants			
4	<b>Small Trees</b> Tree canopy for "Small Trees" or equivalent (canopy spread of 8' to 15') - calculated at 75 sq ft per tree	0	0	0.3	0
		trees			
5	<b>Small/Medium Trees</b> Tree canopy for "Small/Medium Trees" or equivalent (canopy spread 16' to 20') - calculated at 150 sq ft per tree	0	0	0.5	0
		trees			
6	<b>Medium/Large Trees</b> Tree canopy for "Medium/Large Trees" or equivalent (canopy spread of 21' to 25') - calculated at 250 sq ft per tree	0	0	0.7	0
		trees			
7	<b>Large Trees</b> Tree canopy for "Large Trees" or equivalent (canopy spread of 26' or more) - calculated at 350 sq ft per tree	0	0	0.9	0
		trees			
8	<b>Preserved Trees</b> Tree canopy for preservation of existing trees with trunks 6"+ DBH (Diameter at Breast Height, 4.5' above the ground) - calculated at 20 sq ft per inch diameter	0	0	1	0
		inches			

\* Do not count public rights-of-way in parcel size calculation.

\*\* You may count landscape improvements in rights-of-way contiguous with the parcel. All landscaping on private and public property must comply with the Landscape Standards Director's Rule (DR XX-2020).

**C Green roofs**

1	Green roofs over at least 2" and less than 4" of growth medium	<input type="text" value="0"/> square feet	0.4	0
2	Green roofs 4" - 8" of growth medium	<input type="text" value="0"/> square feet	0.6	0
3	Green roofs 8"+ of growth medium	<input type="text" value="0"/> square feet	0.8	0

**D Vegetated walls**

NC, C, SM, and South Downtown zones only

<input type="text" value="0"/> square feet	0.4	0
---	-----	---

**E Permeable paving**

1	Permeable paving over at least 6" and less than 24" of soil or gravel	<input type="text" value="0"/> square feet	0.2	0
2	Permeable paving over at least 24" of soil or gravel	<input type="text" value="0"/> square feet	0.5	0

**F Structural soil systems**

<input type="text" value="0"/> square feet	0.5	0
---	-----	---

sub-total of sq ft =

**G Bonuses**

1	Landscaping that consists of drought-tolerant and/or native plant species	<input type="text" value="0"/> square feet	0.1	0
2	Landscaped areas where at least 50% of annual irrigation needs are met through the use of harvested rainwater or collected greywater	<input type="text" value="0"/> square feet	0.2	0
3	Vegetation visible to passersby from adjacent public right of way or public open spaces	<input type="text" value="0"/> square feet	0.2	0
4	Landscaping in food cultivation	<input type="text" value="0"/> square feet	0.1	0

Green Factor numerator =

\* Do not count public rights-of-way in parcel size calculation.

\*\* You may count landscape improvements in rights-of-way contiguous with the parcel. All landscaping on private and public property must comply with the Landscape Standards Director's Rule (DR XX-2020).

REVISED 07-07-2020

# Appendix B

## Complete Washington, DC GAR Enabling Legislation

**ZONING COMMISSION FOR THE DISTRICT OF COLUMBIA  
NOTICE OF FINAL RULEMAKING**

**AND**

**Z.C. ORDER NO. 12-10**

**Z.C. Case No. 12-10**

**(Text Amendment – 11 DCMR)**

**New Chapter 34, Green Area Ratio; §§ 412 Pervious Surface Minimum Requirements for  
R-1 through R-4 Zones, and 2115.19 Landscape Standards for Parking Lots**

**June 24, 2013**

The Zoning Commission for the District of Columbia (Commission), pursuant to its authority under § 1 of the Zoning Act of 1938, approved June 20, 1938 (52 Stat. 797; D.C. Official Code § 6-641.01 (2008 Repl.)), hereby gives notice of its adoption of amendments to the Zoning Regulations, Title 11 of the District of Columbia Municipal Regulations (DCMR) that add a new § 412, Pervious Surface Minimum Requirements for R-1 through R-4 zones, a new § 2111, Surface Parking Lots Landscaping Standards, and a new Chapter 34, Green Area Ratio. A conforming amendment is also made to § 3104.1.

The Green Area Ratio (GAR) chapter provides rules for a city-wide requirement for green site design that will vary by zones, except for the R-1 through R-4 Zone Districts. Chapter 34 includes explanation of the system, methods of calculation, terms of measurement, and requirements for review. The GAR chapter is substantially similar to provisions adopted by the Commission as part of the Zoning Regulations Rewrite process. *See* Z.C. Order No. 08-06-E, 58 DCR 5964 (July 15, 2011). Those provisions will not become effective until a new Title 11 is published and will be modified to reflect the changes made by the Commission to the text adopted through this notice.

To address the R-1 through R-4 zone issue, a pervious surface requirement is adopted. This requirement will work in concert with the lot occupancy limitations to ensure not only consistent density characteristics within a zone district, but introduce an environmental standard to ensure that property is not one hundred percent (100%) paved.

A landscape standard is added for surface parking lots by the addition of a new § 2111.

A Notice of Proposed Rulemaking was published in the *D.C. Register* on January 11, 2013 at 60 DCR 224. For the reasons explained below, a Second Notice of Proposed Rulemaking pertaining only to the proposed new Chapter 34 was published in the *D.C. Register* on May 10, 2013, 60 DCR 6734. The comments received will be discussed later in this Order.

The amendments shall become effective upon the publication of this notice in the *D.C. Register*, but pursuant to new § 3401.1 the requirements of new Chapter 34 will not become applicable until October 1, 2013.

## **Procedures Leading to Adoption of Amendments**

### **Setdown and Public Hearing**

The Office of Planning (OP), in a report dated July 20, 2012, petitioned the Commission for text amendments to add a new Chapter 34, Green Area Ratio; add a new § 412, Pervious Surface Minimum Requirements for R-1 through R-4 Zone Districts, and add a new § 2111, Surface Parking Lots Landscaping Standards.

At its regular public meeting held July 30, 2012, the Commission set down this case for a public hearing.

In a report dated October 15, 2012, the Chair of Advisory Neighborhood Commission (ANC) 6C advised the Commission that on October 10, 2012, at a duly noticed, regularly scheduled, meeting with a quorum of 8 out of 9 commissioners present, the ANC voted 7-1-0 to oppose the proposed regulations. The report stated:

The Green Area Ratio regulations are too complicated and would pose a financial burden on many homeowners. There are problems with the Surface Parking requirements. The Pervious Surface regulation is not workable, with a particular burden on the historic district. The commissioners also questioned whether these regulations would be enforceable.

The ANC also provided suggestions on the phrasing of certain provisions and recommended exempting historic resources from the pervious surface requirement in similar circumstances as stated in the proposed GAR rules.

The Commission held a public hearing on the petition on November 5, 2012. In addition to hearing a presentation by OP, the Commission heard the testimony of Ms. Alma Gates on behalf of the Committee of 100 on the Federal City and Mr. Mark Eckenwiler. Ms. Gates' testimony was generally supportive of the rule, but suggested that if a developer is going to get points for planting trees, then the same developer should lose points for removing trees and begin with a negative GAR score. She also questioned the wisdom of permitting special exception relief and the absence of references to the existing tree and slope overlays. Mr. Eckenwiler testified in opposition to the pervious surface requirements based upon the same concerns identified by ANC 6C.

At the conclusion of the hearing, the Commission requested that OP consider options for the pervious surface requirements in R-4 Zone Districts. In response, OP submitted a supplemental proposal through a report dated November 25, 2012. The report indicated that OP had coordinated the drafting of the revised text with representatives of ANC 6C. Among other things, the revised text included the exception for historic resources suggested by the ANC.



## **First Proposed Action**

At its regularly scheduled public meeting on December 12, 2012, the Zoning Commission took proposed action to approve the petition with the revisions offered by the Office of Planning. For the purposes of rulemakings, proposed action authorizes the Office of Zoning to publish a notice of proposed rulemaking in the *D.C. Register* and to refer the proposed text to the National Capital Planning Commission for the thirty- (30) day review period mandated by § 492 of the District of Columbia Home Rule Act.

The Commission received a large number of comments in respect to the Notice of Proposed Rulemaking published on January 11, 2013. Several of the comments suggested that the Commission should allow a period of time between the effective date of the GAR chapter and the date on which its requirements became applicable. It was also suggested that certain types of building permit applications filed after the applicability date not be subject to the GAR provisions. In addition, the Commission received requests to extend the public comment period, including a request filed by the Deputy Mayor for Planning and Economic Development.

Through a memorandum dated February 6, 2013, OP requested that the Commission defer taking final action on the petition until March 11. OP indicated that it would use the additional time to work with stakeholders on resolving the applicability issues raised. OP stated it would provide final comments based upon these discussions no later than March 1, 2013. At its regularly scheduled meeting held February 11, 2013, the Commission agreed to defer final action, but continued the matter until April 8, with OP's final comments due on April 1, 2013.

In its Supplemental Report of April 1, 2013, OP recommended that the GAR rules not apply until October 1, 2013. Although construction rights under zoning do not normally vest until the date a building permit is issued, OP proposed not applying the GAR rules to any compliant building permit application filed prior to that date and to certain applications filed after that date. Three minor changes were also proposed to the substantive portion of the GAR text.

## **Second Proposed Action and Final Action**

At its regularly scheduled meeting held April 8, 2013, the Commission accepted the recommendations made by OP and authorized the publication of a second notice of proposed rulemaking for the revised GAR text. The Commission received four new comments in response to the notice and one resubmission.

At a regularly scheduled meeting held June 24, 2013, the Commission took final action to adopt the amendments, making no changes to the proposed text of the Chapters 4 and 21 amendments as published in the initial notice of proposed rulemaking. The Commission, however, made clarifying changes to § 3401.4(b)(1) and 3401.4(b)(3) as published in the second notice. Those provisions make GAR inapplicable to building permit applications filed after the October 1, 2013 applicability date if the plans are consistent with an unexpired planned unit development (PUD) depending upon when the PUD was setdown, voted upon, and approved. In its written comments, the George Washington University requested confirmation that the reference to PUDs

included first stage approvals. Since that was the Commission's intent, the two provisions have been revised to refer to first stage, second stage, and consolidated PUDs.

As to the other comments received in response to the second notice, the Commission appreciates the suggestion made but does not believe further changes are required at this time. For the sake of brevity the Commission will not address each and every suggestion made, but offers the following limited response.

As to the suggestion that the impervious surface and GAR rules exceed the Commission's authority, the Commission notes that the rules have the same characteristics and further the same aims as the present tree and slope overlays. The Commission considers it premature to consider whether applications for special exception relief from these requirements should be eligible for the expedited calendar process or subject to a reduced fee. Nor does the Commission agree that chanceries should be exempted. The Commission sees no conflict between the imposition of pervious surface and GAR requirements with § 206 of the Foreign Missions Act, D.C. Official Code § 6-1306. Should a chancery need zoning relief, the BZA can hear and decide the request using the six (6) factors set forth in Subsection (d) of that provision.

No text refinement is needed to assure that row dwellings will be exempted. Chapter 34 exempts buildings for which no certificate of occupancy (C of O) is required. Subsection 3203.1(a) exempts one-family dwellings from obtaining a C of O. A row dwelling is defined as a "*one-family dwelling* having no side yards", 11 DCMR § 199.1 (emphasis added). Therefore, no C of O is required for row dwellings and the GAR exemption applies. Nor is it necessary to amend the provisions concerning nonconforming structures, since the new GAR requirements do not directly affect the size of what can be constructed.

The Commission appreciates the comments concerning staged development on a single record lot and notes that the problem was not raised by the same writer in their earlier submission. The Commission does not believe these proceedings should be further delayed to address these concerns. The same is true for the suggestion that the GAR for Industrial Districts should be reduced from 0.3 to 0.1, which the Commission previously considered when it adopted Z.C. Order No. 08-06-D (Comprehensive Zoning Regulations Rewrite: Subtitle J: Production, Distribution, and Repair Zones), 58 DCR 5766 (July 8, 2011). The Commission concludes that like all zoning measurements, GAR compliance should be limited to the lot of the subject property and not include any landscaping made in the adjacent public space.

### **ANC Great Weight**

In accordance with § 13(d) of the Advisory Neighborhood Commissions Act of 1975, effective March 26, 1976 (D.C. Law 1-21; D.C. Official Code § 1-309.10(d)) the Commission must give great weight to the written issues and concerns of the affected ANCs, which in this case are all ANCs.

As noted, the Commission received a report from ANC 6C that concluded that the GAR rules were too complex and together with that the proposed pervious surface rules would place a

burden on homeowners, particularly those with properties in historic district. The report noted that some of the ANC Commissioners questioned the enforceability of the GAR provisions.

In response to that report, the Commission requested OP to explore options that would ameliorate the ANC's concerns. The Commission concludes that OP's revisions, particularly the express exemption for historic resources, addressed the ANC's principal concerns. The GAR rules are not unduly complex and will not apply to the R-1 through R-4 Zone Districts. The Commission therefore does not agree that the GAR rules will prove burdensome to homeowners. As to enforceability, like any other area requirement all building permit applications subject to these provisions will be reviewed for compliance and noncompliant applications will be denied. The Commission sees no enforcement issue. Having identified the ANC's issues and concerns and explained why the Commission did or did not find the advice persuasive, the ANC was given the great weight to which it is entitled.

**Title 11 DCMR (Zoning) is amended as follows:**

**Chapter 4, RESIDENCE DISTRICTS: HEIGHT, AREA, AND DENSITY REGULATIONS, is amended by adding a new § 412 PERVIOUS SURFACE to read as follows:**

**412 PERVIOUS SURFACE**

412.1 The minimum pervious surface percentage requirement stated below shall be applicable only in conjunction with the following:

- (a) The construction of a new principal structure;
- (b) An addition to a principal or accessory structure, other than a historic resource, that increases the existing lot occupancy at the time of building permit application by ten percent (10%) or more;
- (c) The construction of a new accessory structure that increases the existing lot occupancy at the time of building permit application by ten percent (10%) or more; or
- (d) An addition to a historic resource that increases the existing lot occupancy at the time of building permit application by twenty-five percent (25%) or more.

412.2 For the purposes of § 412.1 a historic resource is a building or structure listed in the District of Columbia Inventory of Historic Sites or a building or structure certified in writing by the State Historic Preservation Officer as contributing to the character of the historic district in which it is located.

412.3 Except as provided in §§412.1 and 412.4 or as otherwise required by this title, the minimum percentage of pervious surface of a lot in a Residence District listed in the table below shall be as set forth in the following table:

<b>ZONE DISTRICT AND STRUCTURE</b>	<b>MINIMUM PERCENTAGE OF PERVIOUS SURFACE</b>
R-1 through R-4 Public recreation and community centers	30%
R-1-A, R-1-B All other structures	50%
R-2 All other structures	30%
R-3 All other structures	20%

412.4 Except as required in § 412.3 for public recreation and community centers or as otherwise required by this title, in the R-4 zone a minimum pervious surface requirement for structures other than those listed in § 412.2 shall be based on lot size as set forth in the following table:

<b>MINIMUM LOT SIZE</b>	<b>MINIMUM PERCENTAGE OF PERVIOUS SURFACE</b>
Less than 1,800 square feet	0%
1,801 to 2,000 square feet	10%
Larger than 2000 square feet	20%

412.5 The percent of pervious surface area shall be calculated by dividing the total area of pervious surfaces on the lot by the total area of the lot.

412.6 Only the following shall be considered pervious surfaces for the purposes of calculating the pervious surface area:

- (a) Grass, mulched groundcover, all areas of a vegetated roof planted with a growing medium, and other planted areas;
- (b) Permeable pavers or paving that facilitate the infiltration of water into the soil; and
- (c) Decks or porches constructed above the surface of the lot that are erected on pier foundations, and that maintain a permeable surface underneath that can facilitate the infiltration of water into the soil.

412.7 The Board of Zoning Adjustment may grant, by special exception, a full or partial reduction in the minimum pervious surface requirement required by this section if, in addition to meeting the general requirements of § 3104, the applicant demonstrates that complying with the minimum pervious surface requirement is impractical because of size of lot, or other conditions relating to the lot or surrounding area that would tend to make full compliance unduly restrictive, prohibitively costly, or unreasonable, or as a result of equivalent measures being implemented on the property that provide the same minimum pervious surface amount.

**Chapter 21 is amended by adding a new § 2111, SURFACE PARKING LOTS LANDSCAPING STANDARDS, to read as follows:**

**2111 SURFACE PARKING LOTS LANDSCAPING STANDARDS**

2111.1 Surface parking areas with ten (10) or more parking spaces shall conform to the landscaping, tree canopy cover, screening, and lighting requirements as set forth in this section:

- (a) A minimum of ten percent (10%) of the total area devoted to parking, including aisles and driveways shall be covered by landscaped areas planted with trees and shrubs;
- (b) The landscaping shall be maintained in a healthy, growing condition; Dead or dying landscaping shall be replaced;
- (c) All end islands of parking rows longer than nine (9) parking spaces, and all areas otherwise not used for ingress and egress, aisles, and parking spaces shall be landscaped;
- (d) Landscaping around the perimeter of the parking area may count toward the area requirement of this subsection up to a distance of six feet (6 ft.) from the pavement;
- (e) All newly planted trees shall have a minimum diameter of two and one-half inches (2.5 in.); all trees shall be planted or retained in a space that provides a minimum of five hundred (500) cubic feet of soil volume per tree; and
- (f) Trees shall be planted a minimum of four feet (4 ft.) from any protective barrier, such as curbs or wheel stops with no horizontal dimension less than four feet (4 ft.) and a minimum depth of three feet (3 ft.).

2111.2 The Board of Zoning Adjustment may grant, by special exception, a full or partial reduction in the landscape standards for parking lots required by this section if, in addition to meeting the general requirements of § 3104, the applicant demonstrates that complying with the landscape standards is impractical because of size of lot, or other conditions relating to the lot or surrounding area that would tend to make full compliance unduly restrictive, prohibitively costly, or unreasonable.

**Chapter 31, BOARD OF ZONING ADJUSTMENT RULES OF PRACTICE AND PROCEDURE, § 3104, SPECIAL EXCEPTIONS, is amended by inserting alphabetically the following new special exception into the chart appended to § 3104.1:**

<b>TYPE OF SPECIAL EXCEPTION</b>	<b>ZONE DISTRICT</b>	<b>SECTIONS IN WHICH THE CONDITIONS ARE SPECIFIED</b>
Green Area Ratio	All Districts where applicable	§ 3405
Minimum Pervious Surface	All Districts where applicable	§ 412
Surface Parking Lots Landscaping Standards	All Districts where applicable	§ 2111

**A new Chapter 34, GREEN AREA RATIO, is added to read as follows:**

- 3400 INTRODUCTION TO GREEN AREA RATIO
- 3401 APPLICABILITY OF GREEN AREA RATIO STANDARDS
- 3402 CALCULATION OF GREEN AREA RATIO
- 3403 LANDSCAPE ELEMENT CONDITIONS FOR GREEN AREA RATIO
- 3404 SUBMITTAL REQUIREMENTS FOR GREEN AREA RATIO
- 3405 SPECIAL EXCEPTIONS FOR GREEN AREA RATIO
- 3406 MAINTENANCE REQUIREMENTS FOR GREEN AREA RATIO

### **CHAPTER 34 GREEN AREA RATIO**

#### **3400 INTRODUCTION TO GREEN AREA RATIO**

3400.1 Green Area Ratio (GAR) is the ratio of the weighted value of landscape elements to land area. The GAR score relates to an increase in the quantity and quality of environmental performance of the urban landscape.

3400.2 Green Area Ratio sets integrated environmental requirements for landscape elements and site design that contribute to the reduction of stormwater runoff, the improvement of air quality, and the mitigation of the urban heat island effect.

3400.3 The purposes of the GAR regulations are to:

- (a) Implement a value-based system of requirements for environmental site design that provides flexibility in meeting environmental performance standards; and
- (b) Promote attractive and environmentally functional landscapes.

3400.4 The purpose of this chapter is to:

- (a) Provide general guidance about the regulation of GAR requirements;

- (b) Define the applicability of GAR;
- (c) Set forth the formula for calculating the GAR and define its component parts;
- (d) Identify those landscape elements that are included in the GAR, explain how their area is measured, and set forth eligibility conditions;
- (e) Establish multipliers for each eligible landscape element;
- (f) Indicate what plans and certifications must accompany an application submitted to demonstrate proof of GAR compliance; and
- (g) Establish maintenance requirements for the landscape elements that are provided as part of a property's GAR requirement.

**3401**

**APPLICABILITY OF GREEN AREA RATIO STANDARDS**

3401.1 The requirements of this chapter shall become applicable October 1, 2013.

3401.2 Except as provided in § 3401.3 and pursuant to the conditions and requirements of this chapter, properties in zones listed in the following table shall provide a GAR as specified in the following table:

ZONE DISTRICT	GREEN AREA RATIO
R-5-A and R-5-B	0.40
R-5-C, R-5-D and R-5-E C-1, C-2-A, C-2-B and C-2-C W-1, W-2, W-3 SP-1, SP-2	0.30
C-3-A, C-3-B	0.25
C-3-C, C-4, C-5, CR and any property within the DDD overlay	0.20
CM-1, CM-2, CM-3 and M, <ul style="list-style-type: none"> <li>• all structures except one story warehouses</li> <li>• one story warehouses</li> </ul>	<ul style="list-style-type: none"> <li>• 0.30</li> <li>• 0.10</li> </ul>

3401.3 The GAR standards set forth in this chapter shall apply to all new buildings and to all existing buildings where any additions within any twelve (12) month period exceed one hundred percent (100%) of the assessed value of the building as set forth in the records of the Office of Tax and Revenue as of the date of the building permit application, except:

- (a) Buildings that do not require certificates of occupancy;

- (b) Municipal wastewater treatment facilities operated by the District of Columbia Water and Sewer Authority;
- (c) The interior renovation of an existing building that:
  - (1) Is located in the Central Employment Area;
  - (2) Has an existing 100% lot occupancy prior to the filing of the building permit;
  - (3) Has an existing roof that cannot support a dead load of four inches (4 in.) of growth medium on the roof; and
  - (4) The work proposed by the building permit application will not result in a roof capable of supporting a dead load of four inches (4 in.) of growth medium on the roof; or
- (d) A historic resource and any additions thereto subject to the provisions of § 3401.7.

3401.4 Notwithstanding §§ 3202.4 and 3401.2, the provisions of this chapter shall not apply to any application for a building permit:

- (a) That has been officially accepted by the Department of Consumer and Regulatory Affairs as being complete prior to October 1, 2013 if the building permit plans are consistent; or
- (b) Filed on or after October 1, 2013 if the building permit plans are consistent with:
  - (1) An unexpired approval of a first stage, second stage, or consolidated planned unit development, variance, special exception, design review under the CG or SEFC overlay, or concept design by the Historic Preservation Review Board or Commission of Fine Arts; provided the vote to approve occurred prior to October 1, 2013;
  - (2) An unexpired approval of a variance, special exception, or design review under the CG or SEFC overlay granted on or after October 1, 2013, for which a public hearing was held prior thereto;
  - (3) An unexpired approval of a first stage, second stage, or consolidated planned unit development that was granted after October 1, 2013, but which was set down for a public hearing prior thereto;



- (4) A Large Tract Review completed prior to July 1, 2012 subject to the following:
  - (A) The application shall be filed no later than July 1, 2014;
  - (B) The application shall be consistent with the conditions of the Large Tract Review;
  - (C) The building shall achieve a GAR of no less than 0.1; and
  - (D) This subparagraph shall expire on July 2, 2014.

3401.5 Any approved change or modification to a permit, project or application in § 3401.3 and 3401.4 that results in an increase in impervious surface or lot occupancy of twenty percent (20%) or more shall cause the GAR to be applicable for that portion of a project that is effected by the modification.

3401.6 In addition to meeting the applicable burden for obtaining further processing approval under a campus plan to construct or add to a building, the college or university applicant shall demonstrate the extent to which the building or addition meets the GAR standards. Further processing approval shall include the determination by the Commission that the proposed building is compliant with the intent of the GAR regulations.

3401.7 A historic resource and any additions thereto are exempt from the requirement of this chapter as a result of a change of use or an increase of intensity of use, except that this chapter shall be applicable when any addition results in an increase in the gross floor area of the historic resource by fifty percent (50%) or more. For the purposes of this chapter a “historical resource” is a building or structure listed in the District of Columbia Inventory of Historic Sites or a building or structure certified in writing by the State Historic Preservation Officer as contributing to the character of the historic district in which it is located.

3401.8 The cost basis for additions, alterations or repairs to an existing building shall be the amount indicated by the applicant on the application for a building permit.

**3402 CALCULATION OF GREEN AREA RATIO**

3402.1 The GAR shall be calculated using the following formula:

$$\text{GAR} = \frac{(\text{area of landscape element 1} \times \text{multiplier}) + (\text{area of landscape element 2} \times \text{multiplier}) + \dots}{\text{Lot Area}}$$

- 3402.2 For the purposes of the above formula and the remainder of this chapter:
- (a) The term “landscape element” refers to one of the elements listed in the table in § 3402.9, and will be hereafter referred to as “landscape element” or “element”;
  - (b) The term “multiplier” refers to the number listed in the Table in § 3402.9 that corresponds to a “landscape element”; and
  - (c) The “area of landscape element” shall be the square feet of a landscape element, unless the element is a tree or large shrub, in which case “area of landscape element” refers to the element’s equivalent square footage as indicated in § 3402.7.

- 3402.3 The process for calculating a property’s GAR under the formula is as follows:
- (a) The area of each landscape element is multiplied by its corresponding multiplier;
  - (b) The resulting numbers for all landscape elements are added together;
  - (c) The resulting point total is then divided by the total land area of the lot; and
  - (d) The product of the equation equals the property’s GAR.

3402.4 The total points for all permeable paving and enhanced tree growth credits may not count for more than one-third (1/3) of the GAR score for a lot.

3402.5 If multiple landscape elements occupy the same area, for example groundcover under a tree or trees and shrubs on an intensive green roof, the full square footage or equivalent square footage of each element may be counted.

3402.6 A landscape element must meet the eligibility conditions of § 3403.

3402.7 Equivalent square feet of tree canopy and large shrubs are identified in the table below.

<b>GREEN AREA RATIO LANDSCAPE ELEMENTS</b>	<b>EQUIVALENT SQUARE FOOTAGE</b>
Plants, not including grasses, at least 2 feet tall at maturity	9 s.f. per plant
Tree canopy for trees 2.5 inches to 6 inches in diameter	50 s.f. per tree
Tree canopy for trees 6 inches to 12 inches in diameter	250 s.f. per tree
Tree canopy for trees 12 inches to 18 inches in diameter	600 s.f. per tree
Tree canopy for trees 18 inches to 24 inches in diameter	1300 s.f. per tree
Tree canopy for trees larger than 24 inches in diameter	2000 s.f. per tree

3402.8

Landscape elements of the GAR shall be measured in the following ways:

- (a) All trees shall be measured for diameter at a height four feet, six inches (4 ft. 6 in.) above grade when planted and the square footage equivalent based on diameter shall be as established in the table in § 3402.7;
- (b) For vegetated walls, use the vertical square footage of the portion of the wall covered by vegetation; and
- (c) For all other elements other than trees, large shrubs, perennials, and vegetated walls, square footage is determined by the area of a horizontal plane that is over the element.

3402.9

Eligible landscape elements are identified in the table below:

<b>GREEN AREA RATIO LANDSCAPE ELEMENTS</b>	<b>MULTIPLIER</b>
Landscape area (select one of the following for each area)	
Landscape areas with a soil depth of less than 24 inches	0.3
Landscape areas with a soil depth of 24 inches or more	0.6
Bioretention facilities	0.4
Plantings	
Ground covers, or other plants less than 2 feet tall at maturity	0.2
Plants , not including grasses, at least 2 feet tall at maturity	0.3
Tree canopy for all trees 2.5 inches to 6 inches in diameter	0.5
Tree canopy for new trees 6 inches in diameter or larger	0.6
Tree canopy for preservation of existing trees 6 inches to 24 inches in diameter	0.7
Tree canopy for preservation of existing trees 24 inches diameter or larger	0.8
Vegetated wall, plantings on a vertical surface	0.6
Vegetated roofs	
Extensive vegetated roof over at least 2 inches but less than 8 inches of growth medium	0.6
Intensive vegetated roof over at least 8 inches of growth medium	0.8
Permeable paving	
Permeable paving over at least 6 inches and less than 2 feet of soil or gravel	0.4
Permeable paving over at least 2 feet of soil or gravel	0.5
Other	

<b>GREEN AREA RATIO LANDSCAPE ELEMENTS</b>	<b>MULTIPLIER</b>
Enhanced tree growth systems	0.4
Renewable energy generation (area of)	0.5
Water features (using at least 50% recycled water)	0.2
Bonuses	
Native plant species listed in §3403.9	0.1
Landscaping in food cultivation	0.1
Harvested stormwater irrigation	0.1

**3403 LANDSCAPE ELEMENT CONDITIONS FOR GREEN AREA RATIO**

3403.1 No landscape element may be counted towards a property’s GAR unless it meets the applicable conditions stated in this section.

3403.2 Plantings over the specified soil depths shall meet the required conditions listed in the Table of Landscape Elements and Multipliers in § 3402.9.

3403.3 Bioretention facilities shall be landscaped areas that receive rainwater from surrounding areas and use plants and soils to slow, filter, and infiltrate stormwater runoff. *Bioretention facilities* include but are not limited to rain or rainwater gardens, bioretention planters, or linear cells or swales. These do not include structures made of cement or concrete alone.

3403.4 Trees shall meet the following conditions:

- (a) All trees shall be at least two and one-half inches (2.5 in.) in diameter measured at a height four feet, six inches (4 ft. 6 in.) above grade when planted and shall be replaced if damaged or killed by any cause; and
- (b) All trees shall meet the American Standard for Nursery stock, as set forth by the American Nursery and Landscape Association.

3403.5 Vegetated walls shall meet the following conditions:

- (a) The maximum calculated vertical dimension shall not exceed thirty feet (30 ft.) unless the vegetated wall features a built-in growth medium;
- (b) The area calculated for the vegetated wall features shall be fully covered within a period of two (2) to five (5) years from planting;
- (c) The area calculated is the ground coverage area, not the total plant growth area;
- (d) The walls shall be at least five feet (5 ft.) from a side or rear lot line; and

- (e) Where stormwater harvesting for irrigation is proposed, vegetated walls shall contain a connection to the proposed irrigation system.

3403.6 Vegetated roofs shall meet the following conditions:

- (a) Designs for vegetated roofs must include plans to provide supplemental water;
- (b) Where stormwater harvesting for irrigation is proposed, vegetated roofs shall contain a connection to the proposed irrigation system; and
- (c) The groundcover vegetation on a vegetated roof is not additionally eligible for groundcover value towards GAR requirements.

3403.7 Water features shall meet the following conditions:

- (a) Water features must use harvested rainwater for at least fifty percent (50%) of the annual flow; and
- (b) The water features must be under water for at least six (6) months out of twelve (12).

3403.8 Enhanced tree growth systems shall meet the following conditions:

- (a) Be at least twenty-four inches (24 in.) deep, under pavement, and adjacent to planting areas; and
- (b) Be composed of soils that are not considered contaminated or compacted according to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, approved December 11, 1980 (94 Stat. 2767; 42 USC § 9601 *et seq.*).

3403.9 Native plant species shall meet the following conditions:

- (a) The plants are listed in the U.S. Fish and Wildlife Service's Native Plants for Wildlife Conservation Landscaping: Chesapeake Bay Watershed guide; or
- (b) The applicant provides two (2) references in current publications showing that the plant is native to the region; and
- (c) The plant is not listed on the U.S. Fish and Wildlife Service's list of Plant Invaders of Mid-Atlantic Natural Areas.

3403.10 Food cultivation shall meet the following conditions:

- (a) All food cultivation areas must be easily accessible to at least one occupant of the building;

- (b) All food cultivation areas must have a source of water that can reach all portions of the food cultivation area; and
- (c) The cultivation of animals for food is not eligible for GAR credits.

3403.11 Harvesting stormwater for irrigation shall meet the following conditions:

- (a) If the irrigation type is spray, applicants shall follow treatment standards set forth in the current District Department of Environment's Stormwater Management Guidebook; and
- (b) If the irrigation type is drip, no additional treatment of stormwater is required.

### **3404 SUBMITTAL REQUIREMENTS FOR GREEN AREA RATIO**

3404.1 This section lists the submittal requirements for demonstrating compliance with a GAR requirement.

3404.2 For the purposes of this section, the term Certified Landscape Expert means a person who is a:

- (a) State of Virginia certified landscape architect;
- (b) State of Maryland certified landscape architect;
- (c) International Society of Arboriculture Certified Arborist;
- (d) State of Maryland certified Professional Horticulturist; or
- (e) Landscape Contractors Association MD-DC-VA Certified Landscape Technician;

3404.3 Applicants shall submit a GAR score sheet with the GAR calculated for the given lot at the time of building permit application.

3404.4 Applicants shall provide a landscape plan prepared by a Certified Landscape Expert that includes the following information:

- (a) GAR elements called out by category and area, which may be provided as a part of the landscape plan or as a separate document;
- (b) Lot dimension and size;
- (c) Location and areas of all landscape elements with dimensions;
- (d) Location, size, and species of all plants used to meet requirements;
- (e) Both common and botanical names of all plant material;

- (f) Identification of all existing trees that are to be preserved, with their location, trunk diameter at four feet, six inches (4 ft. 6 in.) above grade, canopy radius, and species;
- (g) Plans indicating how preserved trees and other plants will be protected during demolition and construction;
- (h) Location and dimensions of wheel stops, curbs, or other devices to protect landscaping for landscaped areas adjacent to driveways;
- (i) A schematic irrigation and drainage plan and the size and depth of all plant containers for rooftop or container landscaping or areas to be irrigated with rainwater;
- (j) Location and size of any trees to be removed;
- (k) Specifications for soil improvement; and
- (l) Signature of the Certified Landscape Expert who prepared the plans together with verification that plantings and other landscape elements meet the requirements of this chapter.

3404.5 Applicants shall provide a landscape maintenance plan prepared and signed by a Certified Landscape Expert that describes how the plantings, water features and hardscape features will be cared for and maintained including:

- (a) Soil preparation;
- (b) Use of compost;
- (c) Plant replacement;
- (d) Irrigation;
- (e) Weed and pest control; and
- (f) Control of noxious or invasive species.

3404.6 The following modifications or substitutions to the landscape elements of an approved landscape plan require a plan revision and approval:

- (a) Number of trees, shrubs, or groundcovers;
- (b) Location of required plantings or landscape features;
- (c) Substitution of species; or
- (d) Revisions of any feature that could decrease the planting area or lower the GAR score.

- 3404.7 Except as provided below, approved landscape elements shall be installed in accordance with the approved plan prior to the issuance of the certificate of occupancy.
- 3404.8 Prior to the issuance of the certificate of occupancy, a landscape checklist must be signed by a Certified Landscape Expert, verifying that that landscaping was installed according to the building permit approved by DCRA.
- 3404.9 The Zoning Administrator may grant a temporary certificate of occupancy when installation of the required landscaping is not currently possible due to weather, season or site construction subject to the condition that the required landscaping must be installed within four (4) months after the date the temporary certificate is issued.
- 3404.10 The Zoning Administrator may grant up to two (2) extensions of a temporary certificate of occupancy, each for a four (4) month period based on the same conditions of § 3404.9.

### **3405 SPECIAL EXCEPTIONS FOR GREEN AREA RATIO**

- 3405.1 The Board of Zoning Adjustment may grant, by special exception, a full or partial reduction in the GAR required under this chapter if, in addition to meeting the general requirements of § 3104, the applicant demonstrates that providing the GAR is impractical as a result of equivalent sustainability measures already being implemented on the property that achieve the intent of the GAR through methods not available through the GAR requirement.

### **3406 MAINTENANCE REQUIREMENTS FOR GREEN AREA RATIO**

- 3406.1 All plantings and landscape elements used to calculate a property's GAR must be maintained for the life of the project. If, for any reason, the installed landscape elements fall below the minimum required GAR score, new eligible landscape elements shall be added to compensate and result in the required ratio. These elements are not required to be the same as the submitted plans, so long as the GAR achieved is equivalent.

On December 10, 2012, upon the motion of Commissioner Miller, as seconded by Commissioner Turnbull, the Zoning Commission **PROPOSED** the amendments at its public meeting by a vote of **5-0-0** (Anthony J. Hood, Robert E. Miller, Peter G. May, and Michael G. Turnbull to propose; Marcie I. Cohen to propose by absentee ballot).

On June 24, 2013, upon the motion of Vice Chairman Cohen, as seconded by Commissioner Turnbull, the Zoning Commission **ADOPTED** the amendments as proposed at its public meeting by a vote of **5-0-0** (Anthony J. Hood, Marcie I. Cohen, Robert E. Miller, Peter G. May, and Michael G. Turnbull to adopt).



In accordance with the provisions of 11 DCMR § 3028.9, this Order shall become effective upon publication in the *D.C. Register*; that is on July 12, 2013.

# Appendix C

## Model Colonie GAR Enabling Legislation

**TOWN OF COLONIE**  
**NOTICE OF PROPOSED RULEMAKING**

**(Comprehensive Zoning Regulations Revision: Green Area Ratio)**

The Town Board of Colonie hereby gives notice of its intent to amend Town Code to adopt a new chapter entitled “Green Area Ratio”. If adopted, the proposed chapter will provide general rules for a Town-wide requirement for green site design standards. This chapter includes explanation of the system, methods of calculation, terms of measurement, and requirements for review.

More detailed information, discussion, and analysis for the proposed text can be found in the following documents, which may be accessed at (*Will need to be developed*)

The following new Chapter 196, **GREEN AREA RATIO**, is proposed.

<b>§ 195-1</b>	<b>INTRODUCTION TO GREEN AREA RATIO</b>
<b>§ 195-2</b>	<b>RELATIONSHIP TO LAND USE SUBTITLES</b>
<b>§ 195-3</b>	<b>APPLICABILITY OF GREEN AREA RATIO STANDARDS</b>
<b>§ 195-4</b>	<b>CALCULATION OF GREEN AREA RATIO</b>
<b>§ 195-5</b>	<b>LANDSCAPE ELEMENT ELIGIBILITY CONDITIONS FOR GREEN AREA RATIO</b>
<b>§ 195-6</b>	<b>SUBMITTAL REQUIREMENTS FOR GREEN AREA RATIO</b>
<b>§ 195-7</b>	<b>SPECIAL EXCEPTIONS FOR GREEN AREA RATIO</b>
<b>§ 195-8</b>	<b>MAINTENANCE REQUIREMENTS FOR GREEN AREA RATIO</b>

**§ 195-1 Introduction to green area ratio**

Green Area Ratio (GAR) is the ratio of the weighted value of landscape elements to land area. The GAR score relates to an increase in the quantity and quality of environmental performance of the urban landscape.

Green Area Ratio sets integrated environmental requirements for landscape elements and site design that contribute to the reduction of stormwater runoff, the improvement of air quality, and the mitigation of the urban heat island effect.

The purposes of the GAR regulations are to:

- Implement a value-based system of requirements for environmental site design that provides flexibility in meeting environmental performance standards; and
- Promote attractive and environmentally functional landscapes.

The purpose of this chapter is to:

- Provide general guidance about the regulation of GAR requirements;
- Define the applicability of GAR;
- Set forth the formula for calculating the GAR and define its component parts;
- Identify those landscape elements that are included in the GAR, explain how their area is measured, and set forth eligibility requirements;
- Establish multipliers for each eligible landscape element;

- Indicate what plans and certifications must accompany an application submitted to demonstrate proof of GAR compliance; and
- Establish maintenance requirements for the landscape elements that are counted toward a property's GAR requirement.

§ 195-2 Relationship to land use subtitles

The GAR regulations of this chapter apply to all zones in all land use subtitles. Each land use subtitle also includes development standards tables containing GAR standards specific to zones within that subtitle.

§ 195-3 Applicability of green area ratio standards

The GAR applies to all new buildings requiring a Certificate of Occupancy and to all existing buildings requiring a Certificate of Occupancy where any additions, alterations, or repairs within any twelve month (12) period exceed one hundred percent (100%) of the assessed value of the building as set forth in the records of the Office of Tax and Revenue as of the date of the building permit application; provided:

The cost basis for alterations or additions to an existing building shall be the amount indicated by the applicant on the application for a building permit; and

The assessed value of the building shall be the value set forth in (Needs to be identified)

§ 195-4 CALCULATION OF GREEN AREA RATIO

The GAR shall be calculated using the following formula:

$$\text{GAR} = \frac{(\text{area of landscape element 1} \times \text{multiplier}) + (\text{area of landscape element 2} \times \text{multiplier}) + \dots}{\text{Lot Area}}$$

For the purposes of this formula and the remainder of this section:

- The term “landscape element” refers to one of the elements listed in the left hand column of Table B, and will be hereafter referred to as “landscape element” or “element;”
- The term “multiplier” refers the number listed in the right hand column of the Table B that corresponds to a “landscape element”; and
- The term “area of landscape element” means the square feet of a landscape element, unless the element is a tree or large shrub, in which case “area of landscape area” refers to the element's equivalent square footage as indicated in Table B.

The process for calculating a property's GAR under the formula is as follows:

- The area of each landscape element is multiplied by its corresponding multiplier;
- The resulting numbers for all landscape elements are added together;
- The resulting point total is then divided by the total land area of the lot; and
- The product of the equation equals the property's GAR.

The total points for all *permeable paving* and *enhanced tree growth* credits may not count for more than one third (1/3) of the GAR score for a lot.

If multiple landscape elements occupy the same area, for example groundcover under a tree, the full square footage or equivalent square footage of each element may be counted.

All landscape elements must meet the eligibility requirements of **Table B: “GREEN AREA RATIO LANDSCAPE ELEMENTS”**

Equivalent square feet of tree and large shrubs are identified in **Table A: “GREEN AREA RATIO LANDSCAPE ELEMENTS”**

<b>“Table A: GREEN AREA RATIO LANDSCAPE ELEMENTS”</b>	<b>EQUIVALENT SQUARE FOOTAGE*</b>
Plants at least 2 feet tall at maturity	9 square feet per plant
Tree canopy for trees 2.5 inches to 6 inches in diameter	50 square feet per tree
Tree canopy for trees 6 inches to 12 inches in diameter	250 square feet per tree
Tree canopy for trees 12 inches to 18 inches in diameter	600 square feet per tree
Tree canopy for trees 18 inches to 24 inches in diameter	1300 square feet per tree
Tree canopy for trees larger than 24 inches in diameter	2000 square feet per tree

*\*to be determined by the town*

Landscape elements of the GAR shall be measured in the following ways:

- All trees shall be measured for diameter at a height four feet, six inches (4 ft. 6 in.) above grade when planted. Use the square footage equivalent based on diameter in the table in Table “B: GREEN AREA RATIO LANDSCAPE ELEMENTS”
- For *vegetated walls*, use the vertical square footage of the portion of the wall covered by vegetation; and
- For all other elements other than trees, large shrubs, perennials, and vegetated walls, square footage is determined by the area of a horizontal plane that is over the element.

Eligible landscape elements are identified in the table below:

<b>Table B: GREEN AREA RATIO LANDSCAPE ELEMENTS</b>	<b>MULTIPLIER*</b>
<b>Landscaped area (select one of the following for each area)</b>	
Landscaped areas with a soil depth of less than 24 inches	0.3
Landscaped areas with a soil depth of 24 inches or more	0.6
Bioretention facilities	0.4
<b>Plantings</b>	
Ground covers, or other plants less than 2 feet tall at maturity	0.2
Plants at least 2 feet tall at maturity	0.3
Tree canopy for all trees 2.5 inches to 6 inches in diameter	0.5
Tree canopy for new trees 6 inches in diameter or larger	0.6

<b>Table B: GREEN AREA RATIO LANDSCAPE ELEMENTS</b>	<b>MULTIPLIER*</b>
Tree canopy for preservation of existing trees 6 inches to 24 inches in diameter	0.7
Tree canopy for preservation of existing trees 24 inches diameter or larger	0.8
Vegetated wall, plantings on a vertical surface	0.6
<b>Vegetated roofs</b>	
Extensive vegetated roof over at least 2 inches but less than 8 inches of growth medium	0.6
Intensive vegetated roof over at least 8 inches of growth medium	0.8
Water features (using at least 50% recycled water)	0.2
<b>Permeable paving</b>	
Permeable paving over at least 6 inches and less than 2 feet of soil or gravel	0.4
Permeable paving over at least 2 feet of soil or gravel	0.5
Enhanced tree growth systems	0.4
Renewable energy generation (area of)	0.5
<b>Bonuses</b>	
Native plant species	0.1
Landscaping in food cultivation	0.1
Harvested stormwater irrigation	0.1

*\*to be determined by the town*

**§ 195-5** Landscape element eligibility conditions for green area ratio

No landscape element may be counted towards a property's GAR unless it meets the applicable eligibility condition stated in this section.

Plantings over the specified soil depths shall meet the required conditions listed in the Table of Landscape Elements and Multipliers in Table B: "GREEN AREA RATIO LANDSCAPE ELEMENTS"

*Bioretention facilities* shall be landscaped areas that receive rainwater from surrounding areas and use plants and soils to slow, filter, and infiltrate stormwater runoff. These do not include structures made of cement or concrete alone.

Trees shall meet the following conditions:

- All trees shall be at least two and one half (2.5) inches in diameter measured at a height four feet, six inches (4 ft. 6 in.) above grade when planted and shall be replaced if damaged or killed by any cause; and
- All trees shall meet the American Standard for Nursery stock, as set forth by the American Nursery and Landscape Association.

*Vegetated walls* shall meet the following conditions:

- The maximum calculated vertical dimension shall not exceed thirty feet (30 ft.) unless the vegetated wall features a built-in growth medium;

- The area calculated for the vegetated wall features shall be fully covered within a period of two (2) to five (5) years from planning;
- The area calculated is the ground coverage area, not the total plant growth area;
- The walls shall be at least *five feet (5 ft.)*\* from a side or rear lot line; and
- Where stormwater harvesting for irrigation is proposed, vegetated walls shall contain a connection to the proposed irrigation system.

*Green roofs* shall meet the following conditions:

- Designs for vegetated roofs must include plans to provide supplemental water for a minimum of two (2) growing seasons;
- Where stormwater harvesting for irrigation is proposed, vegetated roofs shall contain a connection to the proposed irrigation system; and
- The vegetation on a vegetated roof is not additionally eligible for groundcover value towards GAR requirements.

Water features shall meet the following conditions:

- Water features must use harvested rainwater for at least fifty percent (50%) of the annual flow; and
- The water features must be under water for at least six (6) months out of twelve (12).

Enhanced tree growth systems shall meet the following conditions:

- Be at least twenty-four inches (24 in.) deep, under pavement, and adjacent to planting areas; and
- Made up of soils that are not considered contaminated or compacted according to federal Superfund legislation.

Native plant species shall meet the following conditions:

- The plants are not listed in the NYSDEC “New York State Prohibited and Regulated Invasive Plants”
- The Applicant provides two (2) references in current publications showing that the plant is native to the region; and

Food cultivation shall meet the following conditions:

- All food cultivation areas must be easily accessible to at least one (1) occupant of the building;
- All food cultivation areas must have a source of water that can reach all portions of the food cultivation area; and
- The cultivation of animals for food is not eligible for GAR credits.

Submittal requirements for green area ratio:

This section lists the submittal requirements for demonstrating compliance with a GAR requirement. For the purposes of this section, the term Certified Landscape Expert means a person who is a:

- New York State certified landscape architect;
- International Society of Arboriculture Certified Arborist;
- New York State certified Professional Horticulturist; or
- Certified U.S. Green Building Council professional.

Applicants shall submit a GAR score sheet with the GAR calculated for the given lot at the time of building permit application.

Applicants shall provide a landscape plan prepared by a Certified Landscape Expert that includes the following information:

- *Green Area Ratio* elements called out by category and area, which may be provided as a part of the landscape plan or as a separate document;
- Lot dimension and size;
- Location and areas of all landscape elements with dimensions;
- Location, size, and species of all plants used to meet requirements;
- Both common and botanical names of all plant material;
- Identification of all existing trees that are to be preserved, with their location, trunk diameter at four feet, six inches (4 ft. 6 in.) above grade, canopy radius, and species;
- Plans indicating how preserved trees and other plants will be protected during demolition and construction;
- Location and dimensions of wheel stops, curbs, or other devices to protect landscaping for landscaped areas adjacent to driveways;
- A schematic irrigation and drainage plan and the size and depth of all plant containers for rooftop or container landscaping or areas to be irrigated with rainwater;
- Location and size of any trees to be removed;
- Specifications for soil improvement; and



- Signature of the certified landscape expert who prepared the plans together as verification that plantings and other landscape elements meet the requirements of this chapter.

Applicants shall provide a landscape maintenance plan prepared and signed by a Certified Landscape Expert that describes how the plantings will be cared for and maintained including:

- Soil preparation;
- Use of compost;
- Plant replacement;
- Irrigation;
- Weed and pest control;
- Control of noxious or invasive species, and;
- Care and maintenance of water and hardscape features.

The following modifications or substitutions to the landscape elements of an approved landscape plan require a plan revision and approval:

- Number of trees, shrubs, or groundcovers;
- Location of required plantings or landscape features;
- Substitution of species; or
- Revisions of any feature that could decrease planting area or lower the GAR score.

Except as provided below, approved landscape elements shall be installed in accordance with the approved plan prior to the issuance of the Certificate of Occupancy.

Prior to the issuance of the certificate of occupancy, a landscape checklist must be signed by a Certified Landscape Expert, verifying that that landscaping was installed according to the building permit approved by the Town.

The Zoning Administrator may grant a temporary certificate of occupancy when installation of the required landscaping is not currently possible due to weather, season or site construction subject to the condition that landscaping must be installed within four (4) months after the date the temporary certificate is issued.

The temporary certificate of occupancy may be extended up to two (2) times by four (4) month periods by the Zoning Administrator.

Maintenance requirements for green area ratio

All plantings and landscape elements used to calculate a property's GAR must be maintained for the life of the project. If, for any reason, the installed landscape elements fall below the minimum required GAR score, new eligible landscape elements shall be added to compensate and result in the required ratio. These elements are not required to be the same as the submitted plans, so long as the GAR achieved is equivalent.

