Green Area Ratio (GAR) Online Training

Photo credit: Oculus, Inc.
• GAR Information: https://doee.dc.gov/GAR


• PropertyQuest: https://propertyquest.dc.gov/

• 2016 Zoning Map: http://maps.dcoz.dc.gov/zr16/

• DOEE Stormwater Regulation: https://doee.dc.gov/swregs

• DOEE Public Trainings: https://doee.dc.gov/swtraining
Agenda

• Part I: An Introduction to GAR
• Part II: GAR Applicability
• Part III: Plan Development, Permitting Process, and Construction
• Part IV: Landscape Elements and Submission Requirements
Green Area Ratio (GAR) Online Training

Part I:
An Introduction to the Green Area Ratio
WHAT IS GAR?
Green Area Ratio

What is it?

• A flexible green site design requirement established in 2013 that varies by zone.

Menu items may include...

• Permeable pavement
• Vegetated roofs
• Native vegetation
• Rain gardens
• Trees & shrubs
• Green facades
Involved Parties

- Project Applicant & Landscape Expert
- Property Owner
- Board of Zoning Adjustment
- Office of Zoning Administrator
- DCRA Permit Center
- DOEE
HOW GAR WORKS
GAR: How does it work?

How to calculate:

- Add up landscape elements by number or size
  - # trees
  - Size of green roof
  - Size of rain garden
  - # of plants
  - Soil depths
- Divide by lot area
- = GAR score

\[
\text{GAR} = \frac{(\text{area of landscape element 1} \times \text{multiplier}) + (\text{area of landscape element 2} \times \text{multiplier}) + \ldots}{\text{Lot Area}}
\]
<table>
<thead>
<tr>
<th>GAR LANDSCAPE ELEMENTS</th>
<th>MULTIPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscaped area (select one of the following for each area)</td>
<td></td>
</tr>
<tr>
<td>Landscaped areas with a soil depth of less than 24”</td>
<td>0.3</td>
</tr>
<tr>
<td>Landscaped areas with a soil depth of 24” or more</td>
<td>0.6</td>
</tr>
<tr>
<td>Bioretention facilities</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Plantings</strong></td>
<td></td>
</tr>
<tr>
<td>Ground covers, or other plants less than 2’ tall at maturity</td>
<td>0.2</td>
</tr>
<tr>
<td>Plants at least 2’ tall at maturity</td>
<td>0.3</td>
</tr>
<tr>
<td>Tree canopy for all new trees with mature canopy spread of 40’ or less</td>
<td>0.5</td>
</tr>
<tr>
<td>Tree canopy for all new trees with mature canopy spread of 40’ or greater</td>
<td>0.6</td>
</tr>
<tr>
<td>Tree canopy for preservation of existing trees 6” to 24” in diameter</td>
<td>0.7</td>
</tr>
<tr>
<td>Tree canopy for preservation of existing trees 24” diameter or larger</td>
<td>0.8</td>
</tr>
<tr>
<td>Vegetated wall, plantings on a vertical surface</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Vegetated roofs</strong></td>
<td></td>
</tr>
<tr>
<td>Extensive vegetated roof over at least 2” but less than 8” of growth medium</td>
<td>0.6</td>
</tr>
<tr>
<td>Intensive vegetated roof over at least 8” of growth medium</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Permeable paving</strong></td>
<td></td>
</tr>
<tr>
<td>Permeable paving over at least 6” and less than 2’ of soil or gravel</td>
<td>0.4</td>
</tr>
<tr>
<td>Permeable paving over at least 2’ of soil or gravel</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>Enhanced tree growth systems</td>
<td>0.4</td>
</tr>
<tr>
<td>Renewable energy generation (area of)</td>
<td>0.5</td>
</tr>
<tr>
<td>Water features (using at least 50% recycled water)</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Bonuses</strong></td>
<td></td>
</tr>
<tr>
<td>Native plant species</td>
<td>0.1</td>
</tr>
<tr>
<td>Landscaping in food cultivation</td>
<td>0.1</td>
</tr>
<tr>
<td>Harvested stormwater irrigation</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Stackable Elements

- **NEW TREE**: Canopy 40’ or less
  - BONUS: Native species
  - Multiplier: 0.5
- **PLANTS**: At least 2’ at maturity
  - BONUS: Native species
  - Multiplier: 0.3
- **GROUND COVERS**: Less than 2’ at maturity
  - BONUS: Native species
  - Multiplier: 0.2
- **SOILS**: At least 24” depth
  - Multiplier: 0.6
RELATED REGULATIONS
Related Zoning Requirements

Pervious surface requirements
Landscaping for parking lots
Pervious Surface Requirements

- In zones R and RF
- Applies when building a new principal structure or increasing existing lot occupancy by 10%+ for an addition to a principal structure, or 25%+ for an addition to a historic structure
- Pervious = grass; mulched groundcover; plants; trees; permeable pavers; and decks or porches
- C-501 of DCMR 11, DC Zoning Regulations

<table>
<thead>
<tr>
<th>Zone District and Structure</th>
<th>Minimum Percentage of Pervious Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-3, R-13, R-17, R-20</td>
<td>20%</td>
</tr>
<tr>
<td>R-2</td>
<td>30%</td>
</tr>
<tr>
<td>R-6 to R-12, R-14 to R-16, R-19, R-21, R-1-A, R-1-B</td>
<td>50%</td>
</tr>
</tbody>
</table>
Landscaping for Surface Parking

- Minimum 10% of lot landscaped
- Landscape end islands of 9+ spaces
- Trees must be min. 2.5” DBH at planting
- Plant 4’ from protective barriers
- Special exception relief from BZA if impracticable
- C-715 of DCMR 11, DC Zoning Regulations

Photo source: NRDC
GAR & Stormwater Overlap

**Green Area Ratio Rule**
- DCMR Chapter 11
- Requires a C of O
- No Maintenance Covenant
- Interior Renovations:
  - 100% construction cost trigger
- Area Calculations
- Design constraints maximizes healthy vegetation

**Stormwater Rule**
- DCMR Chapter 21
- Includes Public Right of Way
- Unrelated to C of O
- Maintenance Covenant Required
- Interior Renovations:
  - 50% construction cost trigger
- Volume Calculations
- Contributing Drainage Area
- Design constraints maximizes stormwater retention

Overlap: to achieve stormwater environmental benefits
Landscape Elements are often the same practices as LID BMPs
Green Area Ratio (GAR) Online Training
Part II:
GAR Applicability

Photo credit: Oculus, Inc.
Exemptions, Reduced GAR Score, & Campus Plans
Who does not have a GAR?

– Properties within R-, RF-, USN, STE, HE, WR-1, & WR-6
– Buildings that do not require a Certificate of Occupancy,
  • Single family residences
– DC Water wastewater treatment facilities.
– Interior renovations of existing buildings when
  • Located within the Central Employment Area,
Who does not have a GAR?
Who does not have a GAR?

- Properties within R-, RF-, USN, STE, HE, WR-1, & WR-6
- Buildings that do not require a Certificate of Occupancy,
  - Single family residences
- DC Water wastewater treatment facilities.
- Interior renovations of existing buildings when
  - Located within the Central Employment Area,
  - 100 percent lot occupancy,
  - Existing roof not capable of supporting vegetated system, and
  - Proposed work does not result in a roof capable of supporting vegetated roof.
- Interior renovations whose construction costs are less than 100% of the building value
- Buildings or structures deemed “historic resources”,
  - Except when additions increase the gross floor area by 50 percent.
GAR Exemption Status Application

From 11 DCMR Subtitle C § Chapter 6 of the Zoning Regulations

I hereby request evidence of exemption from the Green Area Ratio (GAR) Subtitle C Chapter 6 of DCMR Title 11 for the proposed construction on the property identified below [Any property within the R-, RP-, USN, ST, HE, WR-1, and WR-6 Districts [Subtitle C §601.2] is exempt from GAR.]

Address: ____________________________  Zoning District: ____________________________

Square: ____________________________  Lot: ____________________________  Building Permit Number: ____________________________

Cost of Construction: ____________________________  Assessed Building Value: ____________________________

This property is subject to a previously approved GAR Plan  Yes  No  If yes, please provide approved DOEE Plan Number: ____________________________

<table>
<thead>
<tr>
<th>Allowable Exemptions (CHECK ONE):</th>
<th>Required Signatures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Single dwelling unit [Subtitle A §302.2]; buildings otherwise not requiring a certificate of occupancy [Subtitle C §601.3 (a)].</td>
<td>OEA</td>
</tr>
<tr>
<td>2. Municipal wastewater treatment facilities operated by DC Water [Subtitle C §601.3(b)].</td>
<td>DC Water and OEA</td>
</tr>
<tr>
<td>3. Interior Renovations: (1) Is located in the Central Employment Area; (2) Has an existing one hundred percent (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. [Subtitle C §601.3 (c)].</td>
<td>Structural and OEA</td>
</tr>
<tr>
<td>4. Additions, interior renovations, or both are less than 100 percent of the assessed building value as set forth in the records of the Office of Tax and Revenue as of the date of the building permit application [Subtitle C §601.3 (d)]. (A cost estimate certifying the cost of construction is required.)</td>
<td>OEA</td>
</tr>
<tr>
<td>5. Building(s) or structure(s) certified by the DC Inventory of Historic Sites, or State Historic Preservation Officer, as &quot;historic resource(s)&quot;; any addition results in an increase in the gross floor area of the historic resource by less than fifty percent (50%). [Subtitle C §601.3(d), §601.7].</td>
<td>Historic and OEA</td>
</tr>
</tbody>
</table>

Applicant Name: ____________________________

Address: ____________________________

Signature: ____________________________  Phone: ____________________________  Email: ____________________________  Date: ____________________________

Below for D.C. Government Use Only.

STATE HISTORIC PRESERVATION OFFICER [For review of GAR Exemption No. 4 only]
I hereby certify that this property is either a historic landmark or a building or structure contributing to the character of a historic district listed in the D.C. Inventory of Historic Sites. This certification does not constitute an interpretation of zoning or building codes and does not entitle the applicant to any relief not authorized by zoning or building code officials pursuant to the applicable codes.

Signature: ____________________________  Printed Name: ____________________________  Date: ____________________________

DC WATER OFFICER [For review of GAR Exemption No. 2 only]
I hereby certify that this property is a municipal wastewater treatment facility operated by DC Water. This certification does not constitute an interpretation of zoning or building codes and does not entitle the applicant to any relief not authorized by zoning or building code officials pursuant to the applicable codes.

Signature: ____________________________  Printed Name: ____________________________  Date: ____________________________

OFFICE OF ZONING ADMINISTRATOR ONLY [Exemption Categories—Subtitle C §601]
I hereby certify that this property is exempt from the Green Area Ratio standards required pursuant to C-601.3 [C-601.3 (a) thru (d)]. This certification does not constitute an interpretation of zoning or building codes and does not entitle the applicant to any relief not authorized by zoning or building code officials pursuant to the applicable codes.

Signature: ____________________________  Printed Name: ____________________________  Date: ____________________________

DCRA STRUCTURAL [For review of GAR Exemption No. 3 only]
I find there is sufficient evidence the existing roof for the property is NOT capable of supporting a dead load of four inches (4 in.) of growth medium on the roof.
I find there is sufficient evidence the proposed work will NOT result in a roof capable of supporting a dead load of four inches (4 in.) of growth medium on the roof.

This review does not constitute an interpretation of zoning or building codes and does not entitle the applicant to any relief not authorized by zoning or building code officials pursuant to the applicable codes.

Signature: ____________________________  Printed Name: ____________________________  Date: ____________________________
<table>
<thead>
<tr>
<th>Basic Information</th>
<th>Ownership and Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1200 1ST STREET NE</strong></td>
<td><strong>Tax lot</strong> 0672 0856</td>
</tr>
<tr>
<td>SSL (Square, Suffix &amp; Lot)</td>
<td>Premises 1200 1ST ST NE</td>
</tr>
<tr>
<td>Lot type</td>
<td>Owner VEF-VN CAPITOL PLAZA I LLC</td>
</tr>
<tr>
<td>Ward</td>
<td>5530 WISCONSIN AVE STE 1000 CHEVY CHASE, MD 20815-4330</td>
</tr>
<tr>
<td>ANC</td>
<td>Use Commercial-Office-Large</td>
</tr>
<tr>
<td>SMD</td>
<td>Land area 34405 square feet</td>
</tr>
<tr>
<td>Neighborhood Cluster</td>
<td>Tax class Commercial, industrial</td>
</tr>
<tr>
<td>Police District</td>
<td>Tax rate n/a</td>
</tr>
<tr>
<td>Police Service Area</td>
<td>Current assessment (2016)</td>
</tr>
<tr>
<td>Voting Precinct</td>
<td>land $16,101,540</td>
</tr>
<tr>
<td>Zoning</td>
<td>improvements $147,076,840</td>
</tr>
<tr>
<td>Downtown subarea</td>
<td>total $163,178,380</td>
</tr>
<tr>
<td>2010 census tract</td>
<td>Proposed assessment (2017)</td>
</tr>
<tr>
<td>2010 census block group</td>
<td>land $16,101,540</td>
</tr>
<tr>
<td>2010 census block</td>
<td>improvements $136,528,090</td>
</tr>
<tr>
<td><strong>No historic resources noted.</strong></td>
<td>total $152,629,630</td>
</tr>
</tbody>
</table>
Transition Period: No GAR

• Building Permit Filed prior to October 1, 2013,
  – DCRA officially accepted as being complete.

• Building Permit Filed on or after October 1, 2013,
  – Unexpired approval, provided the vote to approve occurred prior to October 1, 2013,
    • A first stage, second stage, or consolidated planned unit development,
    • A variance, special exception, design review under the CG or SEFC overlay, or
    • A concept design by the Historic Preservation Review Board or Commission of Fine Arts.
Transition Period: No GAR

- **Building Permit Filed on or after October 1, 2013,**
  - Unexpired approval granted after October 1, 2013, provided a public hearing occurred prior to October 1, 2013,
    - A variance, special exception, or design review under the CG or SEFC overlay.
  - Unexpired approval granted after October 1, 2013, provided a set down for a public hearing occurred prior to October 1, 2013,
    - A first stage, second stage, or consolidated planned unit development.
Transition Period: Reduced GAR

• Building Permit Filed on or after October 1, 2013 but no later than July 14, 2014,
  – A Large Tract Review (LTR) completed prior to July 1, 2012,
  – Application consistent with conditions of LTR,
  – GAR equals 0.1 or greater,
    • independent of zone district.
APPLICATION FOR EXEMPTION STATUS
FROM D.C. ZONING REGULATION GREEN AREA RATIO
BASED ON TRANSITION PERIOD FILING STATUS

Thereby request evidence of a transition period exemption from the Green Area Ratio (GAR) Subtitle C, Chapter 6 of DCMR Title 11 for the proposed construction on the property identified below.

Address:

Square: Lot: Building Permit #:

Allowable Transition Period Exemptions (CHECK ONE):

<table>
<thead>
<tr>
<th>Building Permit filed prior to October 1st, 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unexpired approval of a first stage, second stage, or consolidated planned unit development (PUD) when vote to approve occurred before October 1st, 2013.</td>
</tr>
<tr>
<td>Unexpired approval of a variance, special exception, design review under the CC or SEPC overlay when vote to approve occurred before October 1st, 2013.</td>
</tr>
<tr>
<td>Unexpired approval of a concept design by the Historic Preservation Review Board or Commission of Fine Arts when vote to approve occurred before October 1st, 2013.</td>
</tr>
<tr>
<td>Unexpired approval of a variance, special exception, design review under the CC or SEPC overlay when a public hearing occurred before October 1st, 2013.</td>
</tr>
<tr>
<td>Unexpired approval of a first stage, second stage, or consolidated planned unit development (PUD) when public hearing occurred before October 1st, 2013.</td>
</tr>
<tr>
<td>Property is not exempt from GAR. The applicable zone is __________ and the minimum required score is __________ square feet.</td>
</tr>
</tbody>
</table>

NOTE: When impervious surface or lot occupancy is increased by 30 percent or more, that increase is not covered under this exemption. The GAR is applied to the modification.

Applicant

Address

Signature Date

Office of Zoning Administrator Date
Reduced GAR

• A special exception from the Board of Zoning Adjustment (BZA) may be granted if the application meets sustainability goals through means outside the scope of the GAR.

• Full or partial reduction in GAR score requirement

• Upload BZA Order with reduced GAR requirements to the stormwater database

• 6-month process
Campus Plan

- College or university proposing new building or addition to existing building
  - Demonstrates the extent to which GAR is met
  - Reviewed by the Zoning Commission
  - Must be reviewed by the Zoning Commission prior to submitting to DOEE for technical review
Who has a GAR Requirement?
## GAR Required by Zone District:
### Effective September 6, 2016

<table>
<thead>
<tr>
<th>Zone District</th>
<th>Green Area Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA-1, RA-2, RA-6, RA-7, RA-8</td>
<td>0.40</td>
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<tr>
<td>RC-1; WR-2, WR-3, WR-4, WR-5, WR-7, WR-8</td>
<td></td>
</tr>
<tr>
<td>RA-3, RA-4, RA-5, RA-9, RA-10</td>
<td>0.30</td>
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<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>MU-7, MU-8, MU-28, CG-3</td>
<td>0.25</td>
</tr>
<tr>
<td>NC-6, NC-8, NC-12, NC-13, NC-15, ARTS-3</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td>0.20</td>
</tr>
<tr>
<td>PDR (all lots unless otherwise noted):</td>
<td></td>
</tr>
<tr>
<td>• Lot with principal building that is one (1) story in height</td>
<td>0.30</td>
</tr>
<tr>
<td>• Lot with principal building that is two (2) stories in height</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>0.20</td>
</tr>
</tbody>
</table>
Who has a GAR?

- **All New Buildings** that require a Certificate of Occupancy (C of O).
  - Submit during the Foundation-to-Grade (FD) or Building (B) permit application

- **Additions and Interior Renovations** to existing buildings,
  - When the construction cost exceeds 100% of the assessed building value within any 12-month period.
  - A “historic resource” with a 50 percent (or more) increase to the gross floor area.
  - Submit during the Building (B) permit application
### Basic Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1200 1ST STREET NE</td>
<td></td>
</tr>
<tr>
<td>SSL (Square, Suffix &amp; Lot)</td>
<td>0672 0856</td>
</tr>
<tr>
<td>Lot type</td>
<td>tax lot</td>
</tr>
<tr>
<td>Ward</td>
<td>Ward 6</td>
</tr>
<tr>
<td>ANC</td>
<td>ANC 6C</td>
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<tr>
<td>SMD</td>
<td>SMD 6C06</td>
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<td>Neighborhood Cluster</td>
<td>Cluster 25</td>
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<tr>
<td>Police District</td>
<td>Fifth Police District</td>
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<tr>
<td>Police Service Area</td>
<td>PSA 501</td>
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<tr>
<td>Voting Precinct</td>
<td>Precinct 83</td>
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<tr>
<td>Zoning</td>
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<td>Downtown subarea</td>
<td>NOMA</td>
</tr>
<tr>
<td>2010 census tract</td>
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<tr>
<td>2010 census block group</td>
<td>2</td>
</tr>
<tr>
<td>2010 census block</td>
<td>2023</td>
</tr>
</tbody>
</table>

*No historic resources noted.*

### Ownership and Taxes

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax lot</td>
<td>0672 0856</td>
</tr>
<tr>
<td>Premises</td>
<td>1200 1ST ST NE</td>
</tr>
<tr>
<td>Owner</td>
<td>VEF-VN CAPITOL PLAZA I LLC</td>
</tr>
<tr>
<td>Owner address</td>
<td>5530 WISCONSIN AVE STE 1000</td>
</tr>
<tr>
<td>City</td>
<td>CHEVY CHASE, MD</td>
</tr>
<tr>
<td>State</td>
<td>20815-4330</td>
</tr>
<tr>
<td>Use</td>
<td>Commercial-Office-Large</td>
</tr>
<tr>
<td>Land area</td>
<td>34405 square feet</td>
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<td>Tax class</td>
<td>Commercial, industrial</td>
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<tr>
<td>Tax rate</td>
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<td>Current assessment (2016)</td>
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<td>land</td>
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<td>$136,528,090</td>
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</tr>
</tbody>
</table>
Definitions...

• **Addition and interior renovation** of existing building structure
  – Extension or increase in floor area or height.
  – Alteration, renovation or repair to the interior of the existing structure.

• **Assessed value** of the building, not including the land value
  – Office of Tax and Revenue records.
  – Date of the building permit application.

• **Historic resource** is a building or structure,
  – Certified by the DC Inventory of Historic Sites or State Historic Preservation Officer.

• **Construction cost** for an addition, alteration, or repair
  – Amount indicated by the applicant in the building permit application (Contract Agreement Form).
• **Construction cost** for an addition, alteration, or repair

Per Section 108.3 of DCMR 12, DC Construction Code, the applicant for a building permit shall provide an estimate permit value:

• The building permit valuation shall be based on the TOTAL value of materials and labor, including electrical, gas, mechanical, plumbing equipment, and permanent systems.

• The total value shall not include architectural, engineering, and other associated professional costs.

• The valuation will be reviewed by DCRA during the building permit review process.

• OZA will request a copy of the construction cost estimate when an applicant requests an exemption from GAR compliances based on the applicant’s assertion that the cost of construction for the addition, interior renovation, or both, are less than 100% of the assessed building value pursuant to C-601.3 of DCMR 11, District of Columbia Zoning Regulations.
Green Area Ratio (GAR) Online Training

Part III:
Plan Development, Permitting Process, and Construction

Photo credit: Oculus, Inc.
GAR Plan Development
GAR Plan Development

- **Do you know the project boundaries?**
- Have you hired a Landscape Expert?
- Do you know the score for your zone?
- Design considerations,
  - Stormwater obligations.
  - Energy goals.
  - Green building standards.
GAR Plan Development: Project Boundaries

• Based on the property’s **Record Lot** boundary
  – If separated into tax lots, show how the whole record lot and each tax lot comply with GAR

• Multiple/phased lots within one permit
  – Each lot must meet its GAR score
  – Checklist sign-off occurs at each phase completion

• Multiple zones in one lot
  – Each zone must meet score, but whole lot may be used
  – Confirmed by OZA

• Lots with historic structures
  – The addition exceeds 50% of the existing gross floor area
  – The historic structure’s footprint is excluded from lot area
Get a Building Plat

When you apply for a building permit to do exterior work on your property (such as building an addition or adding a deck), you must include a building plat – a plat map that includes drawings of all existing and proposed property improvements such as the house, the driveway, the deck you want to build, etc.

The plat should also show all trees that measure at least 4.5 feet above ground and have circumferences of 12 inches or more.

You may order a building plat in person from the Office of the Surveyor using the form below or online (instructions for online ordering are attached below).

You also have the option to skip the trip to our agency by emailing your building plat to the Surveyor’s Office for a certification signature. Follow the simple directions in the Building Plat Digital Certification Guide to receive a digital signature on your building plat to complete the approval process.

Must Read: How to Show Improvements on Your Plat

Related Content:

- Building Plat Request Form
- Ordering Building Plats Online
- Building Plat Digital Certification Guide
GAR Plan Development: Project Boundaries

Applicable GAR Area – Record Lot Boundaries

Only the space within the record lot lines may be used for GAR credit. Plantings in the Public Right-of-Way (PROW) may NOT be used to meet GAR requirements.

- Record lot line
- Building
- Area eligible to meet GAR score
GAR Plan Development: Project Boundaries

Applicable GAR Area – Front Yard in PROW

In this example, the building abuts the property line and the front is located in the PROW. The area in front of the building is ineligible for GAR credit because it is NOT located within the lot lines.

- Record lot line
- Building
- Area eligible to meet GAR score
## Basic Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td><strong>1200 1ST STREET NE</strong></td>
<td></td>
</tr>
<tr>
<td>SSL (Square, Suffix &amp; Lot)</td>
<td>0672 0856</td>
</tr>
<tr>
<td>Lot type</td>
<td>tax lot</td>
</tr>
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<td>Ward</td>
<td>Ward 6</td>
</tr>
<tr>
<td>ANC</td>
<td>ANC 6C</td>
</tr>
<tr>
<td>SMD</td>
<td>SMD 6C06</td>
</tr>
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<td>Neighborhood Cluster</td>
<td>Cluster 25</td>
</tr>
<tr>
<td>Police District</td>
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<tr>
<td>Zoning</td>
<td>D-5</td>
</tr>
<tr>
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<td>NoMa</td>
</tr>
<tr>
<td>2010 census tract</td>
<td>106</td>
</tr>
<tr>
<td>2010 census block group</td>
<td>2</td>
</tr>
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*No historic resources noted.*

## Ownership and Taxes

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<tr>
<td>Premises</td>
<td>1200 1ST ST NE</td>
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<tr>
<td>Owner</td>
<td>VEF-VN CAPITOL PLAZA I LLC</td>
</tr>
<tr>
<td>Address</td>
<td>5530 WISCONSIN AVE STE 1000</td>
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<tr>
<td>City</td>
<td>CHEVY CHASE, MD 20815-4330</td>
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<tr>
<td>Use</td>
<td>Commercial, Office, Large</td>
</tr>
<tr>
<td><strong>Land area</strong></td>
<td>34405 square feet</td>
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<tr>
<td>Tax class</td>
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**Current assessment (2016)**

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<tbody>
<tr>
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<td>improvements</td>
<td>$147,076,840</td>
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<tr>
<td>total</td>
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**Proposed assessment (2017)**

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DC’s Real Property Tax Administration defines assessment and taxation lots, often referred to as A&T lots or simply tax lots. These lots are strictly for real estate taxation purposes and normally defined under two circumstances:

- When property owners ask for their real property tax bills to be consolidated, after they have bought several contiguous record lots; this is called a combine;
- When part of a record lot is sold, but no new record lot is yet defined; this is called a split request.

Tax lots are not determined by survey, and are therefore not official lots in the same way record lots are. These lots are normally numbered between 800 and 1999 within a square to differentiate them from record lots on the property tax maps. When a tax lot is established by RPTA, an A&T Plat is generated by RPTA and forwarded to the surveyor’s office. These A&T Plats are not reviewed but simply filed by the Surveyor; they do not comply with the standards required of subdivision plats, and are not recorded. Tax Lots are not normally acceptable when applying for building permits and must be converted to Record Lots through the normal subdivision process involving the D.C. Surveyor’s Office before permits will be issued. The only exception is if the lot does not face a public street. Furthermore, at the time of
GAR Plan Development: Project Boundaries

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  – If separated into tax lots, show how the whole record lot and each tax lot comply with GAR

• **Multiple/phased lots within one permit**
  – Each lot must meet its GAR score
  – Checklist sign-off occurs at each phase completion

• **Multiple zones in one lot**
  – Each zone must meet score, but whole lot may be used
  – Confirmed by OZA

• **Lots with historic structures**
  – The addition exceeds 50% of the existing gross floor area
  – The historic structure’s footprint is excluded from lot area
Phased Development Plan

If the development plan is phased, then submit one master plan outlining the phases, and then submit the GAR under the individual permits associated with each phase.

Assume the total lot GAR score must be at least 0.3
GAR Plan Development:
Project Boundaries

Phased Development Plan

If the development plan is phased, then submit one master plan outlining the phases, and then submit the GAR under the individual permits associated with each phase.

**Phase 1 Score: 0.3**
**Total Site Score: 0.1**

Area required to meet GAR score for Phase 1
GAR Plan Development: Project Boundaries

Phased Development Plan

If the development plan is phased, then submit one master plan outlining the phases, and then submit the GAR under the individual permits associated with each phase.

Area required to meet GAR score for Phase 2
GAR Plan Development: Project Boundaries

Phased Development Plan

If the development plan is phased, then submit one master plan outlining the phases, and then submit the GAR under the individual permits associated with each phase.

Area required to meet GAR score for Phase 3
Phased Development Plan

If the development plan is phased, then submit one master plan outlining the phases, and then submit the GAR under the individual permits associated with each phase.

Assume the total lot GAR score must be at least 0.3
GAR Plan Development: Project Boundaries

- Based on the property’s **Record Lot** boundary
  - If separated into tax lots, show how the whole record lot and each tax lot comply with GAR

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- Lots with historic structures
  - The addition exceeds 50% of the existing gross floor area
  - The historic structure’s footprint is excluded from lot area
Multiple Zones in One Lot Where One Lot Does Not Have a GAR Requirement

If developing a record lot which contains more than one zone and one zone does not have a GAR requirement, the applicant is required to meet the minimum score for the zone with the GAR requirement. The denominator for the score sheet is the area within the zone with the GAR requirement, not the entire lot. The landscape elements (LE) used to meet the GAR score may be selected from anywhere within the property.

The property to the left is split into 2 zones. Zone 1 has no GAR requirement. Zone 2 has a GAR requirement. The surface area of Zone 2 is the denominator used to calculate the GAR score.
Multiple Zones in One Lot Where One Lot Does Not Have a GAR Requirement

If developing a record lot which contains more than one zone and one zone does not have a GAR requirement, the applicant is required to meet the minimum score for the zone with the GAR requirement. The denominator for the score sheet is the area within the zone with the GAR requirement, not the entire lot. The landscape elements (LE) used to meet the GAR score may be selected from anywhere within the property.
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If developing a record lot which contains more than one zone, the applicant is required to meet the minimum score for each zone. The applicant must provide a separate score sheet for each zone which has a GAR requirement. The denominator for each score sheet is the area within each zone, not the entire lot. The landscape elements (LE) used to meet each score are not required to be within that zone area, but may be selected from anywhere within the subject property.

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The property to the left is split into 2 zones, with 5 landscape elements spread throughout the property.
Multiple Zones in One Lot

If developing a record lot which contains more than one zone, the applicant is required to meet the minimum score for each zone. The applicant must provide a separate score sheet for each zone which has a GAR requirement. The denominator for each score sheet is the area within each zone, not the entire lot. The landscape elements (LE) used to meet each score are not required to be within that zone area, but may be selected from anywhere within the subject property.

Zone 1 Landscape Elements

Zone 1

LE1

LE3

LE4

Zone 2

LE2

LE5

Landscape elements L1, L2, and L3 are being used to meet the Zone 1 GAR score. Note that L2 is not located within Zone 1.

Zone 1 credited landscape elements
Multiple Zones in One Lot

If developing a record lot which contains more than one zone, the applicant is required to meet the minimum score for each zone. The applicant must provide a separate score sheet for each zone which has a GAR requirement. The denominator for each score sheet is the area within each zone, not the entire lot. The landscape elements (LE) used to meet each score are not required to be within that zone area, but may be selected from anywhere within the subject property.

Zone 2 Landscape Elements

Landscape elements L4 and L5 are being used to meet the Zone 2 GAR score. Note that L4 is not located within Zone 2.
GAR Plan Development

• Do you know the project boundaries?
• **Have you hired a Landscape Expert?**
• Do you know the score for your zone?
• Design considerations,
  – Stormwater obligations.
  – Energy goals.
  – Green building standards.
GAR Plan Development:
Who is a Landscape Expert?

- **Certified Landscape Expert is:**
  - Maryland or Virginia Licensed Landscape Architect
  - International Society of Arboriculture (ISA) Certified Arborist
  - Maryland Certified Professional Horticulturist
  - Landscape Contractors Assoc. MD-DC-VA certified Landscape Technician
GAR Plan Development

- Do you know the project boundaries?
- Have you hired a Landscape Expert?
- **Do you know the score for your zone?**
- Design considerations,
  - Stormwater obligations.
  - Energy goals.
  - Green building standards.
### GAR Plan Development

<table>
<thead>
<tr>
<th>Zone District</th>
<th>Green Area Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA-1, RA-2, RA-6, RA-7, RA-8&lt;br&gt;RC-1; WR-2, WR-3, WR-4, WR-5, WR-7, WR-8</td>
<td>0.40</td>
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<tr>
<td>RA-3, RA-4, RA-5, RA-9, RA-10&lt;br&gt;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&lt;br&gt;SEFC-2, SEFC-3, CG-1, CG-2, RC-2, RC-3&lt;br&gt;ARTS-1, ARTS-2, D-2, CG-5</td>
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<td>MU-9, MU-10, MU-20, MU-21, MU-22, MU-29&lt;br&gt;D-3, D-4, D-5, D-1-R, D-4-R, D-5-R, D-6, D-6-R, D-7, D-8&lt;br&gt;SEFC-1, CG-4, ARTS-4, CG-3</td>
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<td>PDR (all lots unless otherwise noted):</td>
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<th>Development Standards</th>
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<td><strong>Floor Area Ratio (max.)</strong></td>
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GAR Plan Development

• Do you know the project boundaries?
• Have you hired a Landscape Expert?
• Do you know the score for your zone?
• **Design considerations,**
  – Stormwater obligations.
  – Energy goals.
  – Green building standards.
Permitting Process
Project Applicant determines GAR applicability

Plan development

Request BZA special exception (as necessary)

CLE signs off on plans for approval

Plans submitted to DCRA and uploaded to stormwater database – follow reviewer’s submittal instructions!
Plan Submittals

- Synergy with stormwater and ESC plan submittals
- doe.dc.gov/swtraining

Diagram:
- Building Permit Submittal
  - Score sheet
  - Worksheet
  - Landscape Maintenance Plan
  - Drawings, details, & other required information
  - Landscape Expert signature
DOEE Review within DCRA Permit Process
- DOEE is part of the DCRA permit review process; however, most reviews are done in the stormwater database

DOEE Stormwater Database (https://doee.dc.gov/swdb)
Provide site and plan information for DOEE review of DCRA permit applications for:
- Stormwater Management (SWMPs)
- Soil Erosion and Sediment Control (ESC)
- Green Area Ratio (GAR)
DOEE Plan Review

1. SWDB plan submission
2. Initial fee payment
3. Upload initial fee receipts
4. 30 business days for decision
5. GAR stamp for approval
6. Final fee payment
7. Building permit issued
DOEE Plan Review

1. SWDB plan submission
2. Initial fee payment
3. Upload initial fee receipts
4. 30 business days for decision
   - Resubmit
5. GAR stamp for approval
6. Final fee payment
7. Building permit issued
## Fees

<table>
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<tr>
<th>Payment Type</th>
<th>Payment Requirement</th>
<th>Fees by Land Disturbance Type or Building Footprint</th>
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<tbody>
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<td></td>
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<td>≤10,000 ft²</td>
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<tr>
<td>Initial*</td>
<td>Due upon filing for building permit</td>
<td>$620.52</td>
</tr>
<tr>
<td>Final</td>
<td>Due before building permit is issued</td>
<td>$134.90</td>
</tr>
<tr>
<td>Supplemental</td>
<td>For reviews after first resubmission</td>
<td></td>
</tr>
</tbody>
</table>

*Initial fee includes 1 hour pre-development meeting. Additional meetings are charged an hourly rate of $75.54.

-DOEE Stormwater Management Regulations - Chapter 5, DCMR Title 21 § 501.10 - Fees adjusted annually for inflation - fees above effective January 31, 2020
Plan Revisions After Approval

An additional review is required if:

- Reduce plant quantity
- Change location of landscape element
- Species substitution
- Decrease in GAR score
Construction
Process – Approval to C of O

1. DOEE reviews and approves the GAR Plan
2. CLE oversees installation of GAR landscape elements
3. CLE / DOEE inspect site and sign Landscape Checklist
4. OZA receives Landscape Checklist and issues C of O
5. Property Owner maintains GAR landscape elements
GAR Landscape Checklist

Construction

Landscape Expert confirms installation as per plan

DOEE Inspection

Landscape Checklist

Certificate of Occupancy

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DISTRICT DEPARTMENT OF ENVIRONMENT
WATERSHED PROTECTION DIVISION/INSPECTION & ENFORCEMENT BRANCH

Green Area Ratio - Landscape Checklist

☐ I am a Certified Landscape Expert, as defined in DCMR Title 11, Chapter 34, responsible for confirming installation of the approved landscape plan for development located at:

Street Address (Printed)

Building Permit Number

DDOE Plan Number

Word Lot Square

☐ The landscape elements shown on the DDOE-approved landscape plan or DDOE-approved modification for this property have been installed as approved and in a manner consistent with the standards of 11 DCMR Chapter 34. This includes the number size, and approximate location of plantings and other approved landscape elements.

☐ Any changes or species substitutions (if applicable) have been approved by DDOE.

☐ A completed Landscape Maintenance Plan has been submitted to the property owner.

I declare under penalty of perjury under the laws of the District of Columbia that the following is true and correct.

Signature of Certified Landscape Expert Certification/Registration Number Date

NOTE: If any landscape elements have been changed during installation, DO NOT SIGN OR SUBMIT this checklist until a revised landscape plan has been approved by the District Department of Environment. If you provide false information in this document, you will subject yourself to criminal liability.

[TO BE COMPLETED BY DDOE INSPECTOR]

Document received by: Inspector Signature Printed Name Date

DDOE (WHITE) OWNER/AGENT (YELLOW) LANDSCAPE EXPERT (GOLDENROD) INSPECTOR (PINK)
GAR Landscape Checklist *Online!

**CLE Signoff**

1. CLE creates SWDB account
2. CLE's contact and credential information entered in project entry
3. Inspection occurs between DOEE inspector and CLE or CLE representative
4. CLE receives email notification from SWDB requesting signature
5. CLE completes Checklist questions and electronically signs form
6. Inspector electronically signs form
Temporary Certificate of Occupancy

- Apply to Office of Zoning Administrator
- Renewed twice, each time for 4 months.
- Considered by the DOEE inspector under the following conditions:
  - Weather
  - Seasonal restrictions
  - Site construction
Post-Construction Maintenance

- Property owner responsible after granted Certificate of Occupancy
- Follow landscape maintenance plan provided by Certified Landscape Expert
- Must maintain GAR score
- GAR plan submittal to DCRA not required after Landscape Checklist signed-off
Green Area Ratio (GAR) Online Training

Part IV:
Submission Requirements and Landscape Elements

Photo credit: Oculus, Inc.
Submission Requirements
General Submission Requirements

Minimum Submittal Requirements:
• Completed GAR Scoresheet
• Completed GAR Worksheet, if landscape elements are divided between multiple pages
• GAR plan with landscape elements called out
• Graphic scale, north arrow, and dimensions
• New plat if combining multiple record lots into one
• Completed CLE Signature Template
• Construction sequence for each landscape element
• No invasive plant species permitted to be installed anywhere in GAR projects
• Maintenance plan for all proposed landscape elements
• Integrated Pest Management Plan for projects located within the Anacostia Waterfront Development Zone
SOILS AND AMENDMENTS

Seasonal application
Mulch – Apply yearly or as necessary to replace decomposed mulch.
Compost – Apply compost yearly at 1–2 inch depth. Coarse textured sand and clay soils require greater compost addition than loamy soils. The organic matter content of the chosen compost will determine the depth applied.
Fertilizer – If choosing to apply fertilizer, perform a soil test for nutrient levels only after incorporating compost into topsoil. This will avoid over-application of nutrients, as compost itself will increase the nutrient content.

Material source
Compost should be well-decomposed material, stable, free of weeds, contaminants and foul odors. Compost may be derived from yard waste (decomposed leaves, grass clippings, branches) or food waste.
Mulch can be derived from organic sources such as shredded bark, or leaf mulch.

BIORETENTION

Frequency Maintenance Tasks

Upon establishment
For the first 6 months following construction, the practice and CDA should be inspected at least twice after storm events that exceed 1/2 inch of rainfall. Conduct any needed repairs or stabilization.
Inspectors should look for bare or eroding areas in the contributing drainage area or around the bioretention area, and make sure they are immediately stabilized with grass cover.
One-time, spot fertilization may be needed for initial plantings.

WATERING is needed once a week during the first 2 months, and then as needed during the first growing season (April–October), depending on rainfall.
Remove and replace dead plants. Up to 10% of the plant stock may die off in the first year, so construction contracts should include a care and replacement warranty to ensure that vegetation is properly established
At least 4 times per year
Mow grass filter strips and bioretention with turf cover
Check curb cuts and inlets for accumulated grit, leaves, and debris that may block inflow
Twice during growing season
Spot weed and mulch
Annually

Conduct a maintenance inspection
Supplement mulch in devoid areas to 3” depth
Prune trees and shrubs

LANDSCAPE AREAS ALL PLANTINGS
Provide supplemental watering if rainfall is less than 1 inch per week during the first two growing seasons.
Conduct weeding as necessary to reduce competition between weeds and new plantings for nutrients, soil moisture, and sunlight.
Replace mulch as necessary to reduce competition for available moisture and nutrients.
Monitor the plantings for disease or stress and modify cultural practice as necessary. Employ an integrated pest management (IPM) approach if possible.
Remove dead plant material and replant in the next appropriate growing season.

TREES AND SHRUBS
For trees, install slow leak watering bags or tree buckets during the first two growing seasons and water as necessary to supplement precipitation if less than 1 inch per week.
Inspect trees for signs of dead, diseased, or crossing branches and prune accordingly. Remove hazard limbs especially from established trees. Never remove more than 20% of the tree canopy during pruning activities in any year.
Spread mulch to 2-4 inch depth.
Maintain the health of the tree by limiting all grade changes and other soil disturbance underneath the tree’s Critical Root Zone.

PERENNIALS AND GROUNDCOVERS
In the early spring, deadhead top-growth from perennials and warm-season grasses.
Periodically divide perennials as necessary to encourage rejuvenated growth.
Spread mulch at a maximum 2-inch depth.

TURFGRASS
Test soil for pH and apply lime only as necessary.
Maintain turfgrass at an increased height to reduce weed germination. Never mow more than one third of the grass height.
Leaving grass clippings in-place after mowing requires less fertilizer application.
Regularly monitor and overseed bare spots to prevent weed establishment.
In late fall, core aerate and topdress with organic matter.

VEGETATED WALLS
Living Facades
Periodically inspect roof gutters and drains for clogging with vegetation or debris.
Cable systems may require re-tensioning or inspection of the cable to maintain tension and prevent sagging.

When using harvested stormwater irrigation, valves and fertilizer injectors should be checked for function, and the irrigation pipes checked for leaks. Schedule frequent irrigation inspections. Drip irrigation emitters should be checked during operation to ensure water is being delivered to all panels. Winterize irrigation systems as per the irrigation specification.
Schedule regular plant maintenance during establishment and ongoing growth. Inspect the vegetated wall for signs of disease, inadequate irrigation, and erosion.

HARVESTED STORMWATER IRRIGATION

Cistern
The cistern must be cleaned yearly. To clean, use a submersible pump to remove the water. Brush walls with a hard bristle brush or use a high pressure cleaner.

Purpose of the maintenance is to remove the sediment that inevitably deposits on the cistern’s floor and which may give rise to parasitic fermentation and odor. The rate at which the sediment accumulates depends on the region’s atmospheric pollution (for dust), the roof type, and the quality of the set-up upstream from the cistern’s storage compartment.

A fine mesh filter placed between the roof gutter’s main downspout and the sedimentation basin will substantially delay the accumulation of sediment in the barrel or cistern. Additionally, a sedimentation basin equipped with an appropriate trapped overflow prevents the passage of floating impurities can work. Filters need to be cleared monthly.
Cisterns and rain barrels should be dewatered often to ensure available volume on the onset of rain events.

Irrigation
Conduct frequent inspections to verify integrity of irrigation system.
Periodically review the pressure regulators, filters, controller, sensors, valves, sprinkler heads and other system components to verify they meet original design criteria for efficient operation and uniform water distribution.
AWDZ IPM Maintenance Plan

Appendix S  Integrated Pest Management

S.1  Integrated Pest Management

This appendix is in support of the District of Columbia’s legislation B10-745: The Anacostia Watershed Environmental Standards Amendment Act of 2012. This legislation requires regulated projects in the AWDZ governed by this legislation to receive a DOEE approved Integrated Pest Management Plan (see Figure S.1 for a sample plan).

Integrated Pest Management (IPM) is an approach that applies biological, cultural, mechanical, and chemical controls to manage pests at acceptable levels. The following are general guidelines to encourage a more considered use of fertilizers, herbicides, and pesticides.

S.2  Components of an Integrated Pest Management Plan

1. Identification. Identify the pest and understand its life cycle. Correctly identify the pest to determine an appropriate control strategy. For assistance with pest identification, contact the Maryland Home & Garden Information Center at Maryland Cooperative Extension.

2. When to Take Action. Insects are an integral part of the local ecology; thus, their presence alone is not reason for taking action. First, monitor pest numbers and determine if preventative maintenance measures can be employed to remediate the situation. Take action only when alternative preventative methods are no longer feasible and when pest activity threatens the long-term health of the plant.

3. Prevention in Design:
   (a) Choose the right plant for the right location.
   (b) Assess species’ suitability to site soils, moisture, wind, and sun exposure. Well-selected species require less maintenance.
   (c) Select plant species and cultivars resistant to disease.
   (d) Select a diverse plant palette to ensure ongoing survival of remaining plant material.
   (e) Inspect delivered plant material at the nursery and again prior to installation. Material delivered from the nursery may carry pathogens or insects. Reject any material that is diseased.

4. Prevention in Maintenance and Construction. Proper cultural management practices can reduce pest stress and thus decrease their susceptibility to pests. Prior to applying pesticide or herbicides, consider your current landscape management practices. Soils are the foundation for healthy plants; it is important to provide the proper moisture, fertility, organic matter, and drainage.
   (a) Soil Testing. Submit a soil sample to a soil testing laboratory for analysis. The results will determine the appropriate soil amendments to be applied.

S.3  Sample Form for an Integrated Pest Management Plan

This document will serve as your integrated pest management (IPM) plan. It must be printed and distributed to the owner of the property and any person or company who is given responsibility for an on-site pest management, landscaping, or facility maintenance plan. For the Maintenance Plan (MWP) that this IPM plan supports, the owner of the property must have a pest management agreement with the government.

IPM is a continuous process of controlling pests (weeds, diseases, insects, or other) when pests are identified, action thresholds are exceeded, all potential control options are evaluated, and selected control(s) is implemented. Control options (biological control, cultural, manual, mechanical) and chemical methods are used to prevent or remedy unacceptable pest activity or damage. Choice of control option(s) is based on effectiveness, environmental impact, site characteristics, need to protect health and safety of residents, IPM takes advantage of all appropriate pest management options.

PROJECT INFORMATION

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Street Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Name:</td>
<td>Zip Code:</td>
</tr>
<tr>
<td>Email Address:</td>
<td></td>
</tr>
<tr>
<td>Owner:</td>
<td>Company:</td>
</tr>
<tr>
<td>Address:</td>
<td>Phone:</td>
</tr>
<tr>
<td>Fax:</td>
<td></td>
</tr>
</tbody>
</table>

Figure S.1 Sample form for an Integrated Pest Management Plan.
Landscape Elements
<table>
<thead>
<tr>
<th>GAR LANDSCAPE ELEMENTS</th>
<th>MULTIPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landscaped area (select one of the following for each area)</strong></td>
<td></td>
</tr>
<tr>
<td>Landscaped areas with a soil depth of less than 24”</td>
<td>0.3</td>
</tr>
<tr>
<td>Landscaped areas with a soil depth of 24” or more</td>
<td>0.6</td>
</tr>
<tr>
<td>Bioretention facilities</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Plantings</strong></td>
<td></td>
</tr>
<tr>
<td>Ground covers, or other plants less than 2’ tall at maturity</td>
<td>0.2</td>
</tr>
<tr>
<td>Plants at least 2’ tall at maturity</td>
<td>0.3</td>
</tr>
<tr>
<td>Tree canopy for all new trees with mature canopy spread of 40’ or less</td>
<td>0.5</td>
</tr>
<tr>
<td>Tree canopy for all new trees with mature canopy spread of 40’ or greater</td>
<td>0.6</td>
</tr>
<tr>
<td>Tree canopy for preservation of existing trees 6” to 24” in diameter</td>
<td>0.7</td>
</tr>
<tr>
<td>Tree canopy for preservation of existing trees 24” diameter or larger</td>
<td>0.8</td>
</tr>
<tr>
<td>Vegetated wall, plantings on a vertical surface</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Vegetated roofs</strong></td>
<td></td>
</tr>
<tr>
<td>Extensive vegetated roof over at least 2” but less than 8” of growth medium</td>
<td>0.6</td>
</tr>
<tr>
<td>Intensive vegetated roof over at least 8” of growth medium</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Permeable paving</strong></td>
<td></td>
</tr>
<tr>
<td>Permeable paving over at least 6” and less than 2’ of soil or gravel</td>
<td>0.4</td>
</tr>
<tr>
<td>Permeable paving over at least 2’ of soil or gravel</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>Enhanced tree growth systems</td>
<td>0.4</td>
</tr>
<tr>
<td>Renewable energy generation (area of)</td>
<td>0.5</td>
</tr>
<tr>
<td>Water features (using at least 50% recycled water)</td>
<td>0.2</td>
</tr>
<tr>
<td><strong>Bonuses</strong></td>
<td></td>
</tr>
<tr>
<td>Native plant species</td>
<td>0.1</td>
</tr>
<tr>
<td>Landscaping in food cultivation</td>
<td>0.1</td>
</tr>
<tr>
<td>Harvested stormwater irrigation</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Credits A1-A2: Landscape Soils

<table>
<thead>
<tr>
<th>A1: Soils &lt; 2-foot depth (Multiplier: 0.3)</th>
<th>A2: Soils ≥ 2-foot depth (Multiplier: 0.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credits planted areas without trees or vegetated walls</td>
<td>Credits planted areas with trees, vegetated walls, and/or soils preserved from compaction</td>
</tr>
</tbody>
</table>

Minimum Submittal Requirements:

- Soil depth and area shown on plans
- Soil protection measures and existing vegetation if claiming preservation credit
- Topsoil and soil improvement specifications
- Soil handling notes
- All planting areas next to vehicle access areas must show how vegetation is protected from vehicles (bollards, curbs, etc.)
Credits A1-A2: Landscape Soils

Building

Green façade vegetated wall soil

Not to scale
Lot = 3,000 sf

A1 = 400 sf

A2 = 500 sf

Score:
A1: 400 x 0.3 = 120
A2: 500 x 0.6 = 300
(120 + 300) / 3000 = 0.14
Credit A3: Bioretention

<table>
<thead>
<tr>
<th>Multiplier: 0.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit the area of filter bed (side slopes to be credited under “landscape soils”)</td>
</tr>
<tr>
<td>Utility easements apply</td>
</tr>
<tr>
<td>Must follow SWM Guidebook feasibility, pretreatment, design, construction, and maintenance criteria, as well as DC Water guidelines.</td>
</tr>
<tr>
<td>Must submit geotechnical report to verify infiltration rates* and groundwater table levels.</td>
</tr>
</tbody>
</table>

*Infiltration tests required if not using underdrains.

**Minimum Submittal Requirements:**

- Soil depth and area shown on plans
- Dimensioned details showing media depths
- Filter media specifications
- Construction sequence, following SWM guidelines
Credit A3: Bioretention

Building

Green façade vegetated wall soil

Adjacent Property

Bioretention side slopes

Standard Pavement

16’ – 27’

Record lot lines
A1 eligible soils
A2 eligible soils
Impervious surfaces
New tree
A3 eligible soils

Not to scale
Property Line

Impervious Surface

A1 - Soils < 24”

A2 - Preserved Soils/Soils > 24”

Preserved Soils

Soil Protection

Lot = 3,000 sf

A1 = 300 sf

A2 = 500 sf

A3 = 50 sf

Trees

Score

A1: 300 x 0.3 = 90
A2: 500 x 0.6 = 300
A3: 100 x 0.4 = 40

(90 + 300 + 40) / 3000 = 0.143

Vegetated Wall

Not to scale
## Credits B1-B2: Groundcovers and Plants ≥ 2-Foot Height

<table>
<thead>
<tr>
<th>B1: Groundcovers (Multiplier: 0.2)</th>
<th>B2: Plants ≥ 2-foot height (Multiplier: 0.3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All plants &lt; 2 feet in height</td>
<td>Shrubs, herbaceous, and grass quantity credited on a one-for-one basis as shown on plan – 9 sf per plant</td>
</tr>
<tr>
<td>Credited by mature sf</td>
<td>Trees with less than 400 cf of soil volume or are less than minimum size are credited under B2</td>
</tr>
<tr>
<td>Annuals, bulbs, or plantings that require annual replanting not eligible, unless used for food cultivation purposes</td>
<td></td>
</tr>
</tbody>
</table>

### Minimum Submittal Requirements:
- Plant location and spacing
- Plant schedule containing: common and scientific name, container size, quantity, credit, native status, spacing
- Planting and other details illustrating soil depth, staking, planting hole
- Planting construction notes
Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf

Trees

Score
A Total: 420
B1: 500 x 0.2 = 100
(420 + 100) / 3000 = 0.173
Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf
Trees

Score
A Total: 420
B1: 450 \times 0.2 = 90
B2: 18 \times 9 = 162 \times 0.3 = 48.6
(420 + 90 + 48.6) / 3000 = 0.186

Not to scale
# Credits B3-B4: New Tree Plantings

<table>
<thead>
<tr>
<th>B3: Trees &lt; 40-foot canopy spread*</th>
<th>B4: Trees ≥ 40-foot canopy spread*</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Multiplier: 0.5)</td>
<td>(Multiplier: 0.6)</td>
</tr>
<tr>
<td>Quantity credited on a one-for-one basis as shown on plan – 50 esf per tree</td>
<td>Quantity credited on a one-for-one basin as shown on plan – 250 esf per tree</td>
</tr>
<tr>
<td>Credit by canopy spread</td>
<td>Same</td>
</tr>
<tr>
<td>Minimum tree size:</td>
<td>Same</td>
</tr>
<tr>
<td>• Single trunk – 1.5 inch caliper</td>
<td></td>
</tr>
<tr>
<td>• Multi-stem – 8-foot height</td>
<td></td>
</tr>
<tr>
<td>Minimum soil volume requirements</td>
<td>Minimum soil volume requirements</td>
</tr>
<tr>
<td>• Minimum 400-600 cf soil volume**</td>
<td>• Minimum 1,000-1,500 cf soil volume</td>
</tr>
<tr>
<td>• Measured within 16-foot radius</td>
<td>• Measured within 27-foot radius</td>
</tr>
</tbody>
</table>

*Based on average canopy spread.

**Maximum depth used for calculations is 3 feet.

***Transplanted trees receive credit based on the classifications above.

## Minimum Submittal Requirements:

- Same as Credits B1-B2, plus:
- Soil volume areas and calculations
Credit B3: Trees with <40’ Canopy Spread

Building

Adjacent Property

Record lot lines
Area which may be used to calculate tree soil volume requirements, at 3-foot depth
New tree

Not to scale
Credit B4: Trees with ≥40’ Canopy Spread

Not to scale
Rootable Soil Volume for Trees

- Min 2-3’ depth
- Up to 16’ or 27’ radius

Not to scale
Rootable Soil Volume for Trees – With Permeable Pavement

- New Tree Planting
  - Min 2-3’ depth
  - Up to 16’ or 27’ radius

- Structure or Other Impervious Surface
- Area of soil volume calculations
- In-situ soils
- Permeable pavement with gravel layer

Not to scale
Rootable Soil Volume for Trees – With Structural Soil

Structure or Other Impervious Surface

New Tree Planting

Min 2-3’ depth

Up to 16’ or 27’ radius

Area of soil volume calculations
In-situ soils
Permeable pavement with structural soil
Structural soil used to meet soil volume requirements

Not to scale
Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf
Lot = 3,000 sf

Property Line

Preserved Soils

Soil Protection

Vegetated Wall

Score
A Total: 420
B1: 430 \times 0.2 = 86
B2: 18 \times 9 = 48.6
B3: 3 \times 50 \times 0.5 = 75
(420 + 86 + 48.6 + 75) / 3000 = 0.210

Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf

Not to scale
Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf

Preserved Soils

Soil Protection

Vegetated Wall

Score
A Total: 420
B1: 450 x 0.2 = 90
B2: 18x9x0.3 = 48.6
B4: 1x250x0.6 = 150
(420 + 90 + 48.6 + 150) / 3000 = 0.236

Not to scale
Credits B5-B8: Tree Preservation

<table>
<thead>
<tr>
<th>Credit for tree canopy for preserved tree, trunk at DBH:</th>
<th>Equivalent Square Footage</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 6 in, less than 12 in</td>
<td>250</td>
<td>0.7</td>
</tr>
<tr>
<td>At least 12 in, less than 18 in</td>
<td>600</td>
<td>0.7</td>
</tr>
<tr>
<td>At least 18 in, less than 24 in</td>
<td>1,300</td>
<td>0.7</td>
</tr>
<tr>
<td>At least 24 in</td>
<td>2,000</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Minimum Submittal Requirements:

- Tree survey of all preserved trees showing location, scientific and common name, trunk DBH, condition, and critical root zone (CRZ)
- Tree preservation plan for all construction phases
- Civil site plans showing extent of site work
- *CRZ must not be disturbed*
Critical Root Zone (CRZ)

The CRZ is defined as the radius from the center of the existing tree at 1.5 feet per inch of trunk diameter at breast height (DBH). Any disturbance related to construction activity, including material or equipment stockpiling, is not allowed. Example: an existing tree with a trunk DBH of 20 inches will have a CRZ of 30 feet.
Property Line

Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf

Score
A Total: 420
B1,2,4: 288.6
B5: 2x250x0.7=350

(420+288.6+350) / 3000 = 0.353
Credit B9: Vegetated Walls

<table>
<thead>
<tr>
<th>Multiplier: 0.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credited by vertical coverage</td>
</tr>
<tr>
<td>Soil volume - 1 cf / 10 sf of credited wall coverage</td>
</tr>
<tr>
<td>Max 30-foot height for green facades</td>
</tr>
</tbody>
</table>

**Minimum Submittal Requirements:**

- Same as Credits B1-B2, plus:
- Max growing height, growth habit
- Dimensioned façades and sections showing support structure
- Must be minimum of 5 feet from facing wall or property lines where the adjacent property has a zero-lot line allowance
- Irrigation plan or supplemental irrigation
- Harvested stormwater irrigation, if proposed, serves vegetated wall
Credit B9: Vegetated Walls

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Max. Height (ft.)</th>
<th>Attachment</th>
<th>Sun / Shade</th>
<th>Native</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actinidia polygama</td>
<td>Silver Vine</td>
<td>10-15</td>
<td>Twining</td>
<td>Sun / partial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aristolochia macrophylla (A. durior)</td>
<td>Dutchman's Pipe</td>
<td>20-30</td>
<td>Twining</td>
<td>Sun / partial</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Bignonia capreolata</td>
<td>Crossvine</td>
<td>30-50</td>
<td>Clinging/Twining</td>
<td>Sun / partial</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Campsis radicans</td>
<td>Common Trumpetcreeper</td>
<td>30-40</td>
<td>Clinging</td>
<td>Sun / partial</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
Credit B9: Vegetated Walls

Not to scale
Credit B9: Vegetated Walls

Not to scale
Credit B9: Vegetated Walls

1. Vegetated walls facing adjacent lots with zero lot-line development potential (building can be constructed up to the lot line) shall be at least 5 feet from a side or rear lot line.

2. Vegetated walls shall be at least 5 or more feet from adjacent, facing structures to allow adequate light penetration.

3. The vegetated wall setback does not apply to lot lines abutting streets or alleys.
Lot = 3,000 sf

Score
A Total: 420
B1,2,4: 288.6
B5: 350
B9: 20L x 5H x 0.6
= 60
(420+288.6+350+60) / 3000 = 0.373

Not to scale
### Credits C1-C2: Vegetated Roofs

<table>
<thead>
<tr>
<th>C1: Soils 2-8 inch depth (Multiplier: 0.6)</th>
<th>C2: Soils ≥ 8 inch depth (Multiplier: 0.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credited by surface area</td>
<td></td>
</tr>
<tr>
<td>Depth = soil media only*</td>
<td></td>
</tr>
<tr>
<td>Container plantings (except bioretention) over structure credited</td>
<td></td>
</tr>
<tr>
<td>Plant type by soil media depth and irrigation provided</td>
<td></td>
</tr>
<tr>
<td>Permanent irrigation needs dependent upon specified plant type and % coverage</td>
<td></td>
</tr>
<tr>
<td>Multiplier accounts for soil media + groundcover vegetation – Plants &gt; 2-foot credited separately</td>
<td></td>
</tr>
<tr>
<td>Must follow SWM Guidebook feasibility, design, construction, and maintenance criteria, as well as applicable building codes</td>
<td></td>
</tr>
<tr>
<td>Must achieve 80% coverage within 2 years</td>
<td></td>
</tr>
</tbody>
</table>

*Soil media 1 inch or greater and less than 2 inches may receive credit if supplied with an additional water retention layer with a depth of at least 1 inch.
Minimum Submittal Requirements:

- Soil media depth and area shown on plans
- Details and product specifications
- Plant species, size, spacing, type of root system
- Irrigation plan or supplemental irrigation source
- Existing buildings must provide a statement signed by a structural engineer confirming the roof can support a vegetated roof
- Roof drainage and overflow plan
- Access points for maintenance
- Mechanical equipment and roof penetration locations
- Construction sequence, following SWM guidelines
## Credits C1-C2: Vegetated Roofs: Vegetated Roof Plant Coverage Guidelines

<table>
<thead>
<tr>
<th>Soil media depth</th>
<th>No permanent irrigation</th>
<th>Permanent irrigation</th>
<th>Native (H1.)</th>
<th>Groundcover (B1.)</th>
<th>Plant ≥ 2’ (B2.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–4” soil</td>
<td>Succulents</td>
<td>Succulents-Grasses-Herbaceous</td>
<td>30% max.</td>
<td>No (Included in vegetated roof)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Non-succulents (≤10% cover)</td>
<td>Non-succulents (≤10% cover)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4–8” soil</td>
<td>Succulents-Grasses-Herbaceous</td>
<td>Succulents-Grasses-Herbaceous</td>
<td>50% max.</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-succulents (≤30% cover)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8–12” soil</td>
<td>Succulents-Grasses-Herbaceous</td>
<td>Succulents-Grasses-Herbaceous - Small shrubs</td>
<td></td>
<td>100% max.</td>
<td>Yes</td>
</tr>
<tr>
<td>12–24” soil</td>
<td>Grasses-Herbaceous</td>
<td>Succulents-Grasses-Herbaceous-Shrubs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Succulents (≤10% cover)</td>
<td>Succulents-Grasses-Herbaceous-Shrubs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24”+ soil</td>
<td></td>
<td>Succulents-Grasses-Herbaceous-Shrubs-Trees</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Credits C1-C2: Vegetated Roofs: vegetated roof Plant Coverage Guidelines

Conditions:

• Growing media consists of 70%–80% inorganic material and a maximum of 30% organic matter by volume. Growing media shall be capable of supplying all of the following in quantities sufficient to support plant growth: nutrient supply, water-holding capacity, drainage, root support, and ballast.

• Growing media less than 4 inches deep should have a water-retention layer 0.5 inches thick or greater unless otherwise provided with permanent irrigation. Growing media with a depth of 1 inch or greater and less than 2 inches may be credited if supplied with a water-retention layer 1 inch or greater. Only succulents may be specified and non-natives credited at less than 2-inch depth of growing media.

• Planting designs shall have a minimum of 5–7 species evenly mixed throughout the area to ensure suitability to varied rooftop microclimates. Non-succulent species in non-irrigated or shallow growing media should have demonstrated drought tolerance for vegetated roof conditions (refer to the GAR Plant List for species recommendations).

• Individual native species may compose no more than 20% of total vegetated roof coverage.
Credits C1-C2: Vegetated Roofs

- C1: Extensive vegetated roof
- C2: Intensive vegetated roof
- C2: Non-bioretention planters
- Mechanical equipment without green roof beneath

Not to scale
Lot = 3,000 sf
Extensive vegetated roof
100 sf

A1 = 400 sf

A2 = 500 sf

C1: 100x0.6 = 60

Score
A Total: 420
B Total: 698.6

(420+698.6+60) / 3000 = 0.393

Not to scale
Lot = 3,000 sf

Intensive vegetated roof 100 sf

A1 = 400 sf

A2 = 500 sf

Score
A Total: 420
B Total: 698.6
C2: 100 \times 0.8 = 80
(420 + 698.6 + 80) / 3000 = 0.400

Not to scale
Property Line

Preserved Soils

Soil Protection

Lot = 3,000 sf

Intensive vegetated roof
100 sf

A Total: 420
B Total: 698.6
C2: 100x0.8 = 80
B2 on vegetated roof:
4 x 9 x 0.3 = 10.8
(420+698.6+90.8) / 3000 = 0.403

Lot = 3,000 sf
A1 = 400 sf
A2 = 500 sf

Vegetated Wall

Score

Not to scale
# Credits D1-D2: Permeable Pavement

<table>
<thead>
<tr>
<th>D1: Reservoir depth 6-24 inches (Multiplier: 0.4)</th>
<th>D2: Reservoir depth ≥ 24 inches (Multiplier: 0.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of pavers with reservoir layer beneath</td>
<td></td>
</tr>
<tr>
<td>Cannot credit &gt; 33% of GAR score (total for perm. pavement and enhanced tree growth)</td>
<td></td>
</tr>
<tr>
<td>Credit based on reservoir plus sump (if applicable) depth</td>
<td></td>
</tr>
<tr>
<td>Gravel and soil alone are not credited</td>
<td></td>
</tr>
<tr>
<td>Permeable paving over structure may receive credit, if it drains in 36-48 hours, and a schematic plan showing the flow path of stormwater with the location and type of flow-control roof drains is provided</td>
<td></td>
</tr>
<tr>
<td>Must follow SWM Guidebook feasibility, pretreatment, design, construction, and maintenance criteria, as well as DC Water guidelines.</td>
<td></td>
</tr>
<tr>
<td>Must submit geotechnical report to verify infiltration rates* and groundwater table levels.</td>
<td></td>
</tr>
</tbody>
</table>

*Infiltration tests are required if not using underdrains
Minimum Submittal Requirements:
• Permeable pavement depth and area shown on plans
• Specify the type of permeable pavement to be installed
• Location of observation wells and underdrains (if underdrains required)
• Details showing material depths and types, type of permeable paving, underdrain (if applicable), observation wells
• Construction sequence, following SWM guidelines
• Drawdown calculations (if not using underdrains) – must drain within 36-48 hours
Rootable Soil Volume for Trees – With Structural Soil

Structure or Other Impervious Surface

New Tree Planting

Min 2-3’ depth

Up to 16’ or 27’ radius

Area of soil volume calculations
In-situ soils
Permeable pavement with structural soil
Structural soil used to meet soil volume requirements

Not to scale
Rootable Soil Volume for Trees – With Structural Soil

Not to scale
Rootable Soil Volume for Trees – With Structural Soil

Building

Area which may be used to calculate tree soil volume requirements, at 3-foot depth

Not to scale
Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf

A Total: 420
B Total: 698.6
D1: 500 x 0.4 = 200

\[
\frac{420 + 698.6 + 200}{3000} = 0.440
\]

Permeable Parking, < 24”
500 sf

Score

Not to scale
Lot = 3,000 sf

A1 = 400 sf
A2 = 500 sf

Score
A Total: 420
B Total: 698.6
D2: 500 x 0.5 = 250

(420 + 698.6 + 250) / 3000 = 0.456

Permeable Parking, >= 24”
500 sf
Lot = 3,000 sf

A1 = 700 sf

Score
A1: 700 x 0.3 = 210
B1: 700 x 0.2 = 140
D2: 1,100 x 0.5 = 550
350 + 550 / 3000 = 0.300
210 + 140 + 550 = 900
550 / 900 = 61%

Permeable pavement & enhanced tree growth systems may not exceed 1/3 of the GAR score.
## Credit E1: Enhanced Tree Growth Systems

<table>
<thead>
<tr>
<th>Multiplier: 0.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of soil with structural capacity and located beneath pavers</td>
</tr>
<tr>
<td>Cannot credit &gt; 33% of GAR score (total for perm. pavement and enhanced tree growth)</td>
</tr>
<tr>
<td>Depth of soil media – 2 feet minimum</td>
</tr>
<tr>
<td>Soil media may be credited to both permeable pavers and enhanced tree growth to provide stacked credit</td>
</tr>
<tr>
<td>Can contribute to soil volume requirements</td>
</tr>
<tr>
<td>Show provide minimum opening 2-3 times the size of mature trunk DBH</td>
</tr>
<tr>
<td>Follow SWM Guidebook engineered tree boxes for design guidance</td>
</tr>
</tbody>
</table>

### Minimum Submittal Requirements:
- Soil volume areas and calculations
- Specify if using suspended pavement, sand-based structural soil (SS), or aggregate SS
Rootable Soil Volume for Trees – With Structural Soil

Structure or Other Impervious Surface

New Tree Planting

Min 2-3’ depth
Up to 16’ or 27’ radius

Area of soil volume calculations
In-situ soils
Permeable pavement with structural soil
Structural soil used to meet soil volume requirements

Not to scale
Rootable Soil Volume for Trees – With Structural Soil

Diagram showing:
- Building
- Standard Pavement Over Enhanced Tree Soils
- Permeable pavement with a reservoir layer of structural soil
- New tree

Not to scale
Rootable Soil Volume for Trees – With Structural Soil

Area which may be used to calculate tree soil volume requirements, at 3-foot depth

Not to scale
Credit E2: Renewable Energy

<table>
<thead>
<tr>
<th>Multiplier: 0.5</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar photovoltaic and solar thermal</td>
<td></td>
</tr>
<tr>
<td>Credit provided to area of array</td>
<td></td>
</tr>
<tr>
<td>Vegetated roof below panels may receive full credit, must follow SWM 2017 Errata</td>
<td></td>
</tr>
<tr>
<td>Schematic plan for electrical or plumbing systems</td>
<td></td>
</tr>
<tr>
<td>Shall comply with applicable DCRA building codes</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Submittal Requirements:

- Supplemental solar permit number
- Reference note on GAR plans listing all electrical, plumbing, mechanical, or other relevant solar sheets
- Schematic solar diagram and solar specifications
- Shading analysis
Figure 3.3 Design requirements for structures constructed above green roofs.

Taken from DOEE’s 2020 Stormwater Management Guidebook, Section 3.2
Lot = 3,000 sf

Extensive vegetated roof
100 sf

Solar

Score
A Total: 420
B Total: 698.6
C1 Total: 60
E2: 100 x 0.5 = 50
(1178.6 + 50) / 3000 = 0.410

Not to scale
Credit E3: Water Features

<table>
<thead>
<tr>
<th>Multiplier: 0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of water feature to be under water ≥ 6 months per year</td>
</tr>
<tr>
<td>Harvested rainwater to provide ≥ 50% of water supply</td>
</tr>
<tr>
<td>Schematic plan for electrical or plumbing systems</td>
</tr>
<tr>
<td>Must follow SWM Guidebook for harvested rainwater, as well as applicable building codes</td>
</tr>
</tbody>
</table>

Minimum Submittal Requirements:

- Demonstration that harvested stormwater provides at least 50% of annual irrigation
- Water budget indicating percentage of water demand met by rainwater, calculated on monthly and annual basis
- Construction sequence, following SWM guidelines
Lot = 3,000 sf
Extensive vegetated roof
100 sf

A1 = 400 sf
A2 = 500 sf

Score
A Total: 420
B Total: 698.6
C1 Total: 60
E3: 20 x 0.2 = 4
(1178.6 + 4) / 3000 = 0.394
Bonus Element F1: Native Plants

<table>
<thead>
<tr>
<th>Bonus element (Multiplier: 0.1)</th>
<th>Bonus multiplier may be applied to the following elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native plants</td>
<td>New and existing plantings, tree preservation, vegetated wall, vegetated roof</td>
</tr>
</tbody>
</table>

**Minimum Submittal Requirements:**

- Must first be credited under the landscape element(s) defined above
- Must be listed in the GAR Plant List or the U.S. Fish and Wildlife Service’s Native Plants for Wildlife Conservation Landscaping: Chesapeake Bay Watershed Guide
- Or provide 2 references showing the plant is native to the DC region
Native Species Lists

• U.S. Fish and Wildlife Service’s Native Plants for Wildlife Conservation Landscaping: Chesapeake Bay Watershed Guide
  
  http://www.nps.gov/plants/pubs/chesapeake
  
  http://nativeplantcenter.net/
Invasive Species Lists

- Plant Invaders of Mid-Atlantic Natural Areas
- Mid-Atlantic Exotic Pest Plant Council Plant List
- National Park Service Center for Urban Ecology – Exotic Plant Management Team
- Virginia Invasive Plant Species List
Bonus Element F2: Food Cultivation

### Bonus Element (Multiplier: 0.1)

<table>
<thead>
<tr>
<th>Bonus element</th>
<th>Bonus multiplier may be applied to the following elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food cultivation</td>
<td>New and existing plantings, vegetated wall, vegetated roof</td>
</tr>
</tbody>
</table>

**Minimum Submittal Requirements:**

- Must first be credited under the landscape element(s) defined above
- Location, species, and areas designated for food cultivation
- Identify building access
- Identify type and location of water source
- Annual maintenance and crop cover plan
Bonus Element F3: Harvested Rainwater Irrigation

<table>
<thead>
<tr>
<th>Bonus element (Multiplier: 0.1)</th>
<th>Bonus multiplier must first be applied the following elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvested rainwater irrigation</td>
<td>Landscape soils, new and existing plantings, vegetated wall, vegetated roof</td>
</tr>
</tbody>
</table>

Minimum Submittal Requirements:

- Must first be credited under the landscape element(s) defined above
- Schematic irrigation and drainage plan showing: irrigated areas, delivery system (spray, drip), anticipated water demand, water budget calculated on monthly and annual basis, drainage plan
- Confirm cistern, filters, and pumps are size correctly
- Construction sequence, following SWM guidelines for harvest rainwater
Lot = 3,000 sf

A1 = 400 sf

A2 = 500 sf

Not to scale

Property Line

Preserved Soils

Soil Protection

Vegetated Wall

Score
A & B Total: 1,044
F1: 100+(11x9)+(2x50)+(250)]x0.1 = 54.9
F2: 100x0.1 = 10
F3: 300 x 0.1 = 30
(1,044+54.9+10+30) / 3000 = 0.380
Stay tuned for additional online GAR trainings coming soon!
https://doee.dc.gov/GAR