

WBC REGIONAL SUSTAINABILITY UPDATE

Panelists

Jeff Seltzer, PE

Associate Director

DDOE, Stormwater Management Division

Kim Pexton

Director of Sustainable Construction

HITT Contracting Inc.

Jason Papacosma

Watershed Programs Manager

Arlington County Department of Environmental Services

Moderator – Heather Langford, LEED AP BD+C

U.S. Green Building Council (USGBC)

Breakfast 8:00 to 8:30 a.m.

Presentation 8:30 to 10:00 a.m.

Wednesday, September 18, 2013





Model Codes - Green: IgCC, 189.1 and LEED

**Heather Langford
Director, LEED
USGBC**



Leadership in Energy and Environmental Design

A **code** tells you
what to do...

A **rating system** tells
you *how well you
did...*



LEED and green building
codes work together.

CODES: Raising the FLOOR for all Buildings

- USGBC promotes the adoption of the International Green Construction Code (and its Standard 189.1 jurisdictional compliance option) as a mandatory minimum for all commercial buildings in a jurisdiction.
- The IgCC -in whole or in part -provides an enforceable baseline for communities to reap the benefits of many building strategies that have proven successful and cost effective through beyond-code rating systems like LEED. Single-family and low-rise residential buildings are not covered in the scope of this code.

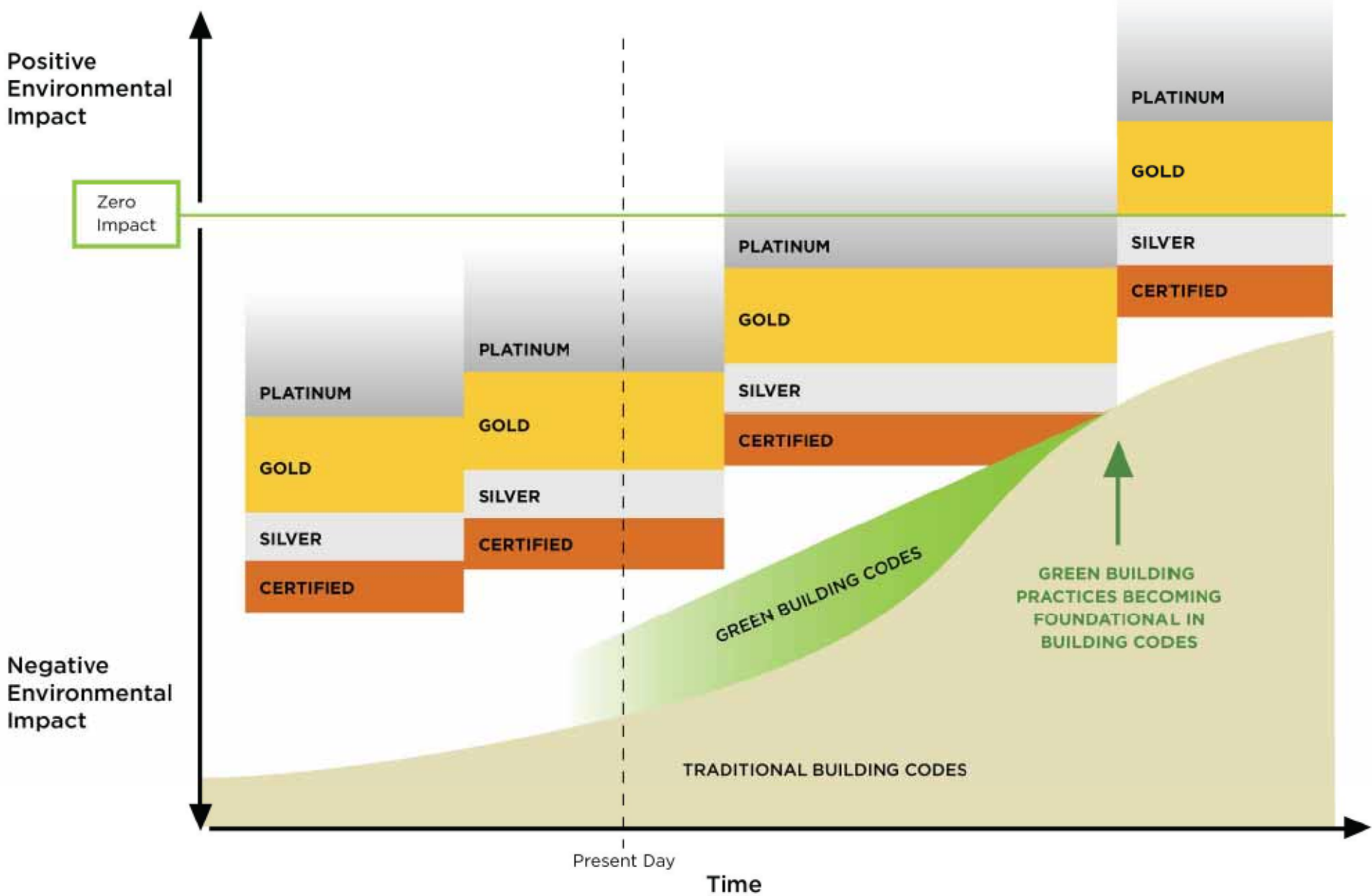
LEED: Raising the CEILING for Leadership

- USGBC promotes incentives for leadership beyond minimum code compliance.
- Developers, property owners and construction teams that voluntarily pursue LEED and take advantage of the third party verified, beyond-code green building certification program are changing the building market.
- Both structural incentives (like expedited permitting) and financial incentives for LEED serve as a driving force for improving building practice in many communities for residential and commercial buildings alike.

CREATIVE TENSION



A long road ahead...



FROM 2009 TO LEED v4: Differences in three main areas

NEW MARKET SECTORS: data centers, warehouses and distribution centers, hospitality, existing schools & retail, and LEED Homes Mid-Rise

CHANGES TO TECHNICAL CONTENT THAT INCREASE TECHNICAL RIGOR: proposed technical changes have been informed by market data, stakeholder-generated ideas, expert engagement, and advances in technology and market accessibility of LEED and green building practices

CREDIT WEIGHTINGS: revised point distribution will more closely tie the rating system requirements to the priorities by the USGBC community

A **SHIFT**

LEED 2009

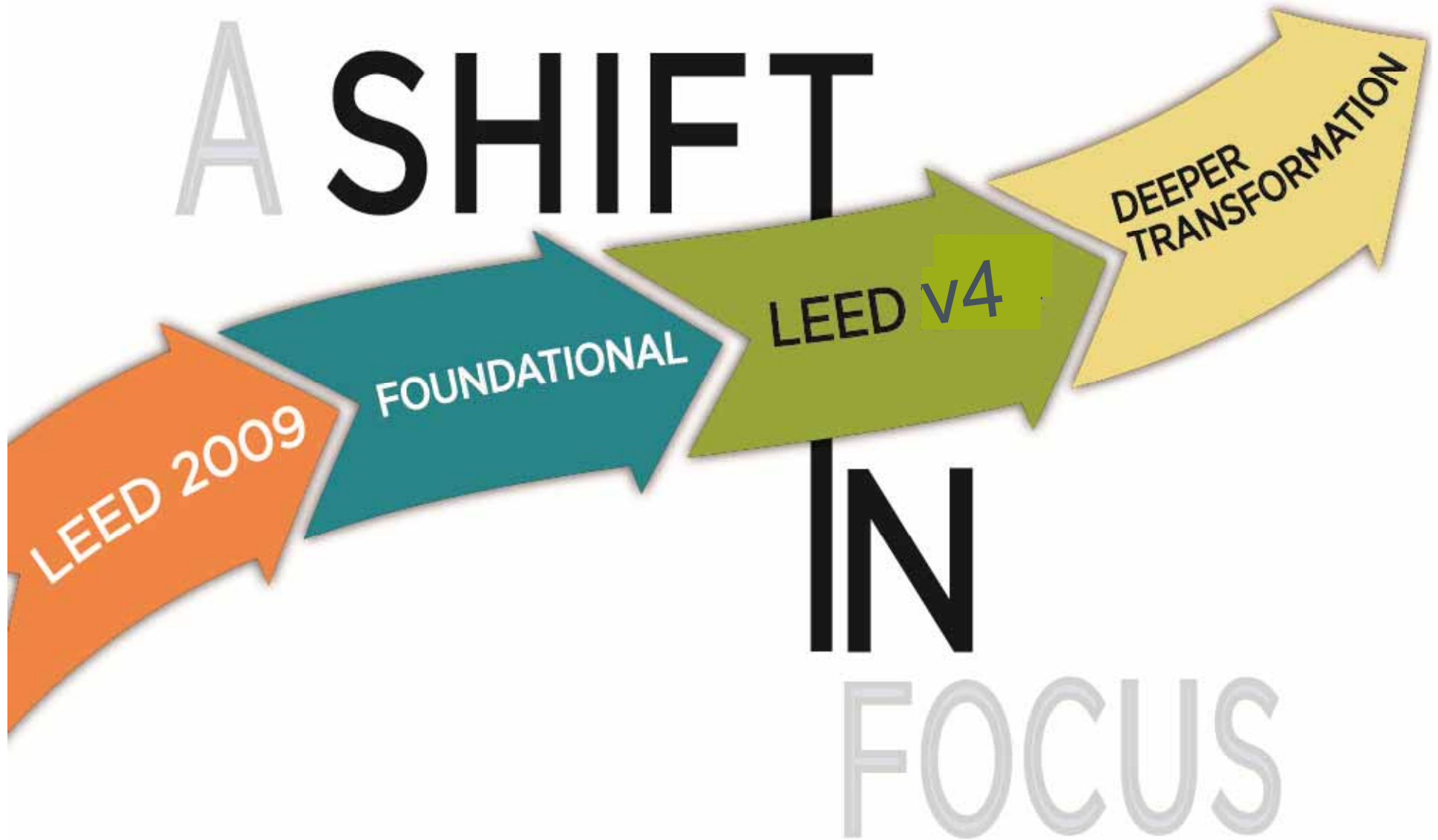
FOUNDATIONAL

LEED v4

DEEPER
TRANSFORMATION

IN

FOCUS



WBC REGIONAL SUSTAINABILITY UPDATE



District of Columbia
Sustainability - Regulatory Update

Jeff Seltzer, PE

DDOE, Stormwater Management Division

- 2013 Final Stormwater Rule
- Building Code Changes
- Zoning Changes – Green Area Ration and Minimum Pervious Surface Requirements



2013 Final Stormwater Rule

Restoring District Waterbodies for Residents, Businesses, & Visitors





Agriculture, Industrialization, Urbanization  Degradation

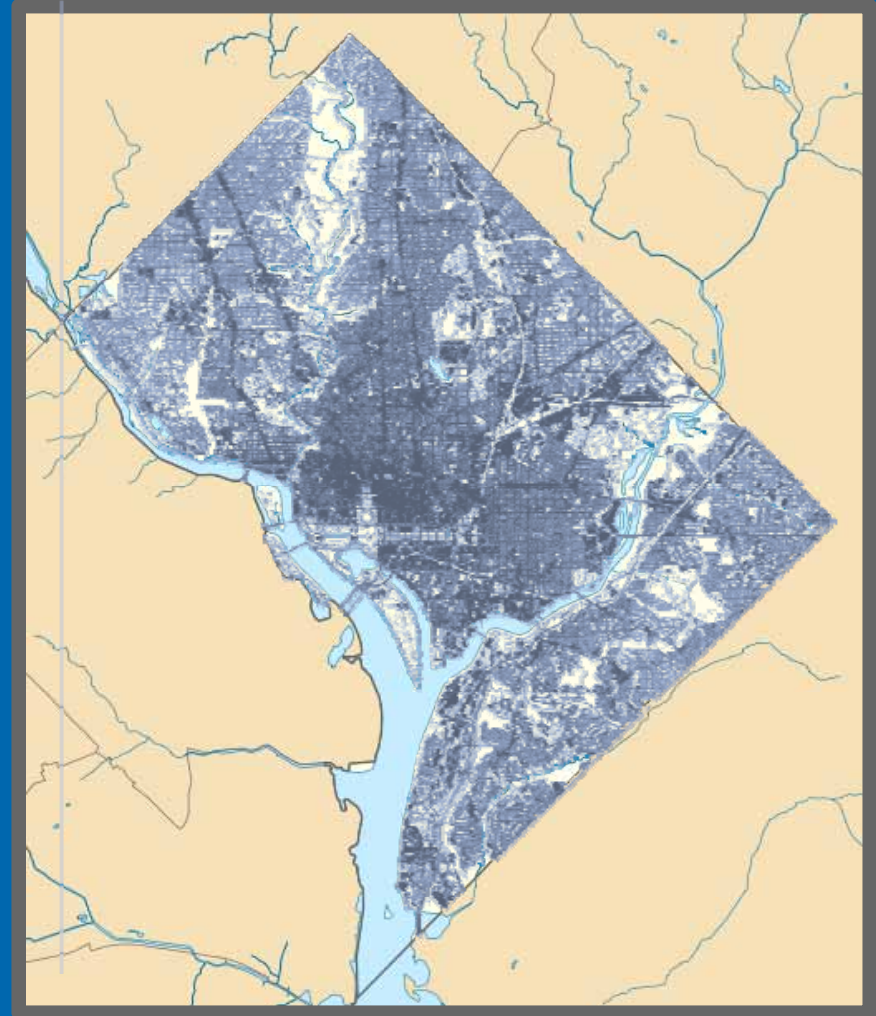


Urbanization Stormwater



Imperviousness in the District

- 43% of the District's land area is impervious.
- A single 1.2 inch storm falling on this area produces about 525 million gallons of stormwater runoff.



Impact on Waterbodies

Stormwater washes trash, sediment, oil, grease, pet waste, and other pollutants into District sewers and waterbodies.



Impact on Waterbodies

Its sheer volume erodes stream channels, toppling trees, washing sediment downstream, and severely degrading aquatic habitat.



Impervious Surface Retrofits

- Retain runoff on site to mimic natural land cover.
- Retention BMPs gradually make District “spongier.”
- Essential for long-term restoration of waterbodies.



Retention Requirements in 2013 Rule

Major land-disturbing activity

- Retain the first 1.2” of rainfall on site or through a combination of on-site and off-site retention.

Major substantial improvement activity

- Retain the first 0.8” of rainfall on site or through a combination of on-site and off-site retention.

Retention achieved with BMPs that infiltrate, evapo-transpire, and/or harvest for non-potable use.

Green Roofs



Stormwater Tree and LID Boxes



Rainwater Harvesting for Non-potable Uses



Flexibility to Use Off-Site Retention

- Free to go off site after achieving 50% of required retention on site.
- Two off-site options:
 - In-lieu fee (ILF) payment to DDOE = \$3.50/gallon/year.
 - Use of privately tradable Stormwater Retention Credits (SRCs).
- Off-site volume is an ongoing obligation that can be:
 - Met on yearly or multi-year basis.
 - Met with a mix of ILF & SRCs and mix can change.
 - Reduced in the future by increasing on-site retention.



Example SRC Transaction

- Grocery parking lot voluntarily retrofits w/4,000 gal BMP to generate 3 years of SRCs or 12,000 SRCs.*
- Church parking lot voluntarily retrofits w/2,000 gal BMP to generate 3 years of SRCs or 6,000 SRCs.
- Regulated site has 3,000 gal yearly offsite obligation & purchases total of 18,000 SRCs to comply for 6 years.
- By end of 6-year period, regulated site purchases additional credits or pays in-lieu fee.

*Opportunity for discount on stormwater impervious fee provides:

- Layered incentive for retrofit and
- Way to split financial benefits – Aggregator & property owner.

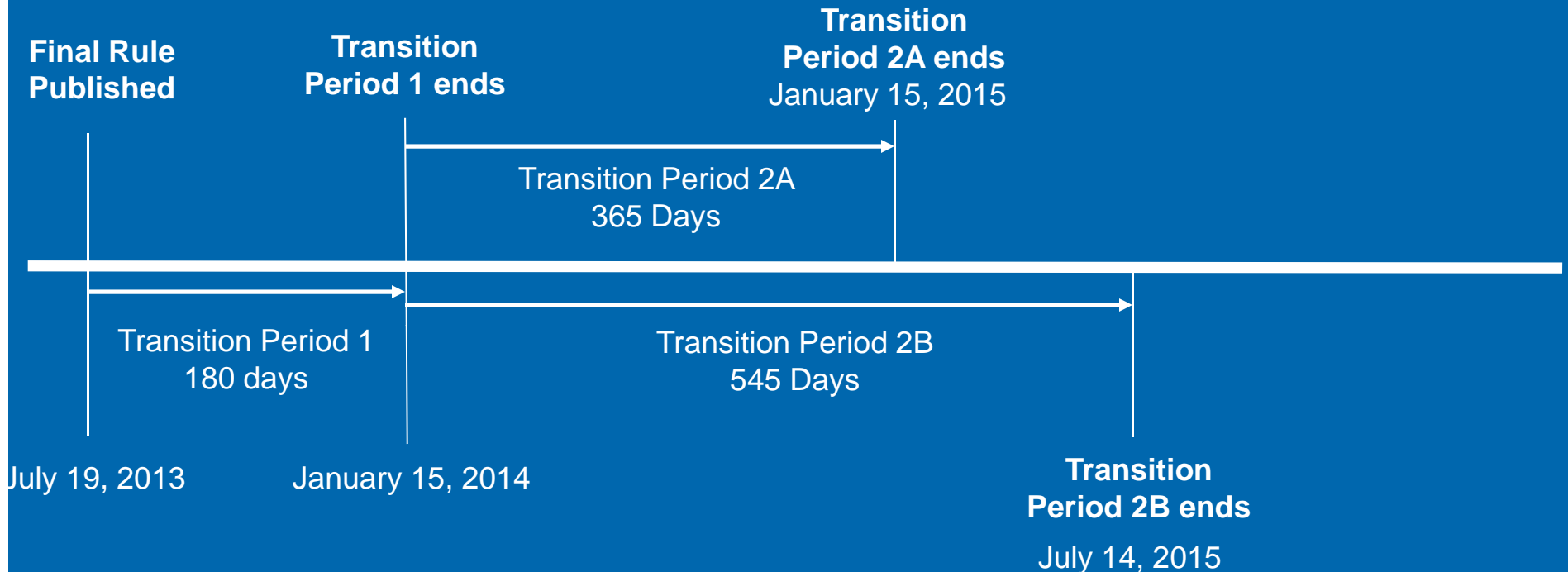
Transition Plan



Transition Period 1

- Regulated projects comply with existing regulations.
- Tied to submittal of first SW Management Plan as part of building permit application process.

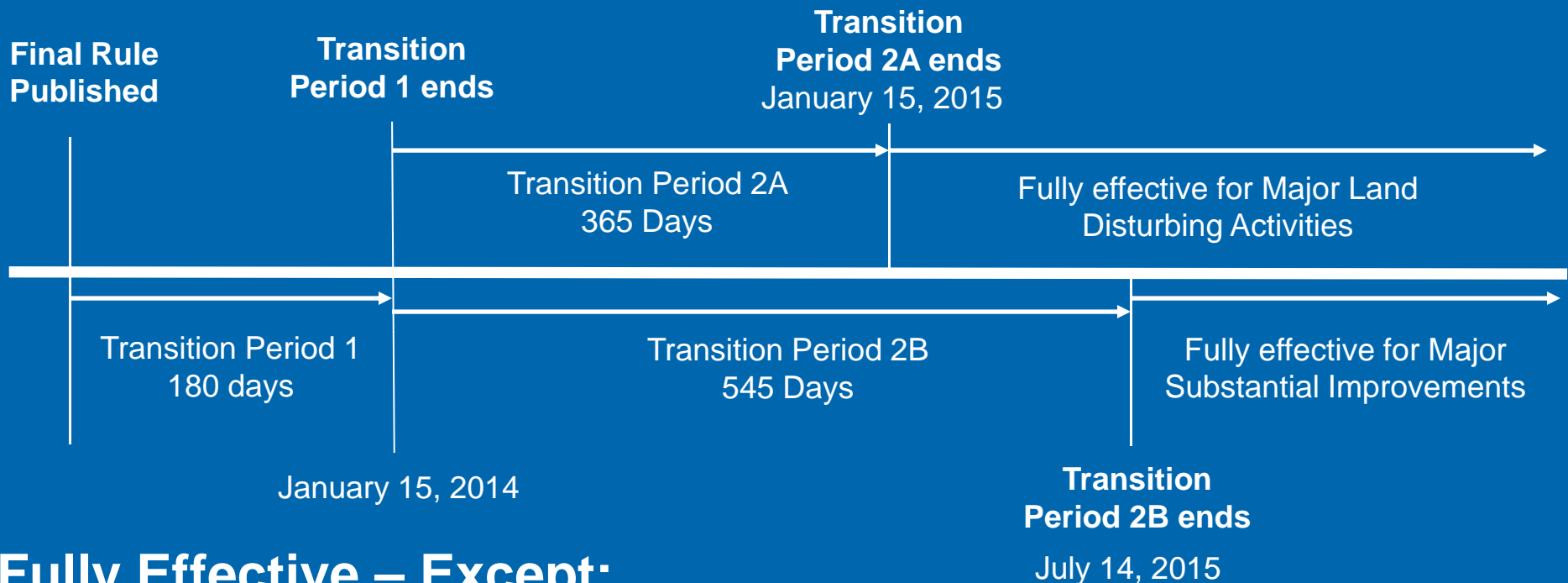
Transition Plan



Transition Period 2A and 2B

- Minimum on-site retention requirement waived.
- Entire retention volume may be achieved off site.

Transition Plan



Fully Effective – Except:

- 1) Certain projects (“Advanced Design”) with unexpired approval by Zoning Com. or NCPC - Subject to TP when application submitted.
- 2) Additional grounds for on-site relief for projects with unexpired approval (from HPRB, CFA, BZA, DCOP, NCPC) that conflicts with on-site BMP – If application submitted prior to end of TP2A/TP2B.

Greening the District's Building Codes



Goals



- ✓ Green the construction code to the maximum extent practicable.
- ✓ Codify the best practices currently followed by green building leaders in the District.



Compliance Paths

- ✓ Green Building Act
- ✓ Int'l Green Construction Code (IgCC)
- ✓ ASHRAE 189.1
- ✓ LEED
- ✓ Green Communities
- ✓ National Green Building Standard



Code Summary - Scope

- ✓ Covers all commercial projects (10,000 SF and larger)
- ✓ Covers multi-family residential 4 stories and larger (and 10,000 SF and larger)



Transitory Provisions for the 2013 Codes

- ✓ Exceptions (Section 123 Building Code)
 - ✓ Projects with existing building permits
 - ✓ Projects with existing design contracts or existing filed application
 - ✓ Tenant layout permits for previously built Core and Shell buildings



Next Steps

- ✓ Second public comment period ended on June 14, 2013
- ✓ Goal is to submit all proposed construction codes to the Mayor and council at the end of September or beginning of October
- ✓ Aiming to have all codes voted on by Council before the end of the year



GREEN AREA RATIO REGULATION



Green Area Ratio

What is it?

- A flexible green site design requirement that varies by zone.

How Achieve?

- Choose from a range of environmental landscaping practices each of which have been assigned an environmental performance ranking.

Examples may include...

- Impermeable pavement
- Impermeable roof
- Un-vegetated permeable pavement
- Vegetated permeable pavement
- Green roofs
- Natural ground cover
- Rain gardens
- Trees & shrubs
- Green facades



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



RELATED ZONING REQUIREMENTS

Pervious surface requirements

Landscaping for parking lots



Pervious Surface Requirements

- In zones R-1 through R-4
- Applies when increasing existing lot occupancy by 10%+ or 25%+ for historic structures
- Pervious = grass; mulched groundcover; plants; trees; permeable pavers; and decks or porches

ZONE DISTRICT AND STRUCTURE	MINIMUM PERCENTAGE OF PERVIOUS SURFACE
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%

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 exceptions if impracticable

QUESTIONS?

Jeff Seltzer

202-535-1603

Jeffrey.Seltzer@dc.gov

To download the District's Final Rule and Stormwater Management Guidebook, & related resources, visit:

[**ddoe.dc.gov/swregs**](http://ddoe.dc.gov/swregs)

For additional information on the Green Area Ratio visit:

[**ddoe.dc.gov/gar**](http://ddoe.dc.gov/gar)

For additional information on the Green Building Codes:

[**ddoe.dc.gov/greenbuildings**](http://ddoe.dc.gov/greenbuildings)

WBC REGIONAL SUSTAINABILITY UPDATE





Washington Building Congress REGIONAL SUSTAINABILITY UPDATE

Kim Pexton, HITT Contracting Inc.



The bottom half of the slide features a close-up photograph of a vintage car's instrument cluster. The entire image is tinted with a green color. It shows five circular gauges in a row, followed by a speedometer. The text 'MILONATT HOUR' is visible on the dashboard panel. Below the gauges, there are labels for 'FLUIDS' and 'SINGLE STATOR W/OUTSIDE METER TYPE A11 S'. The gauges have various scales and needles, and the speedometer has a needle pointing to zero.

	DC Mandate	Current State of Implementation
1	DC Green Building Mandate	Phase in complete; stakeholders awareness is peaked
2	DC Energy Benchmarking	Phase in underway; stakeholder awareness is approaching mid-level and unaware of future initiatives directly related to effort
3	Adoption of International Construction Code INCLUDING modified Part K	Timeline of roll out has been stated; stakeholders have through Spring 2014 to comply; stakeholder awareness is at an early stage
4	Stormwater Management Rulemaking	Enacted July 2013; stakeholders may not be aware

	DC Mandate	Stakeholders Action
1	DC Green Building Mandate	Requirement considered part of base project. No push to go beyond requirement.
2	DC Energy Benchmarking	Property owners in beginning stages of reporting, working to establish central clearinghouse within their organizations, most working to benchmark all properties including those beyond the DC market.
3	Adoption of International Construction Code INCLUDING modified Part K	Those who are aware are working to understand cost impacts relative to both design and construction. Cost will mirror LEED integration costs.
4	Stormwater Management Rulemaking	Civil engineers are currently working to understand impacts.



Key Take Away

DC Energy Benchmarking Rulemaking is only the tip of the iceberg

Green Code adoption provides flexibility and captures project smaller than 50K SF

Stormwater addresses aging systems through equitable distribution

Design to address, associated costs and other analysis is underway

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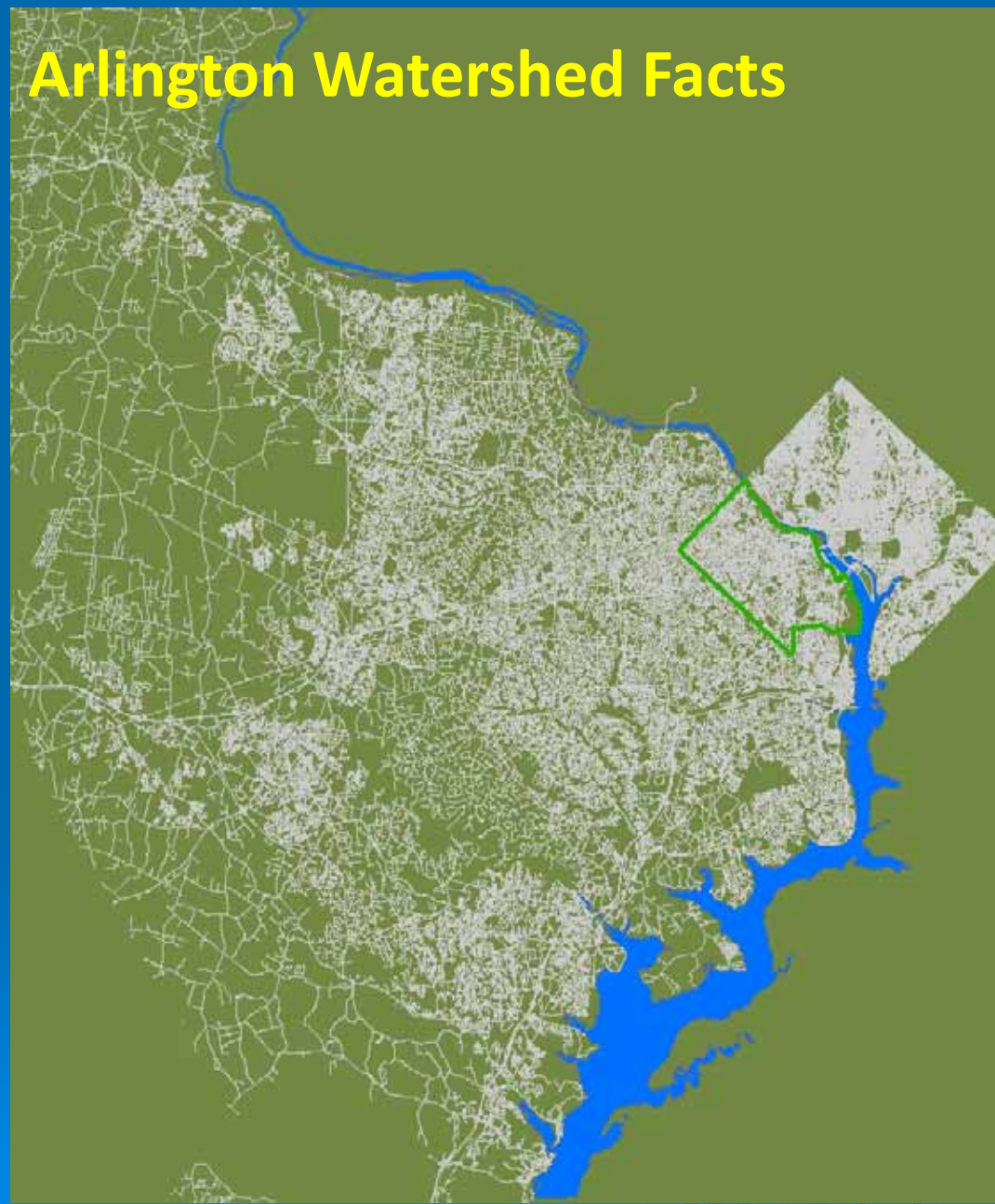
Arlington, VA New State Stormwater Management Regulations

**WBC Regional Sustainability Update
September 18, 2013**

**Jason Papacosma
Watershed Programs Manager**

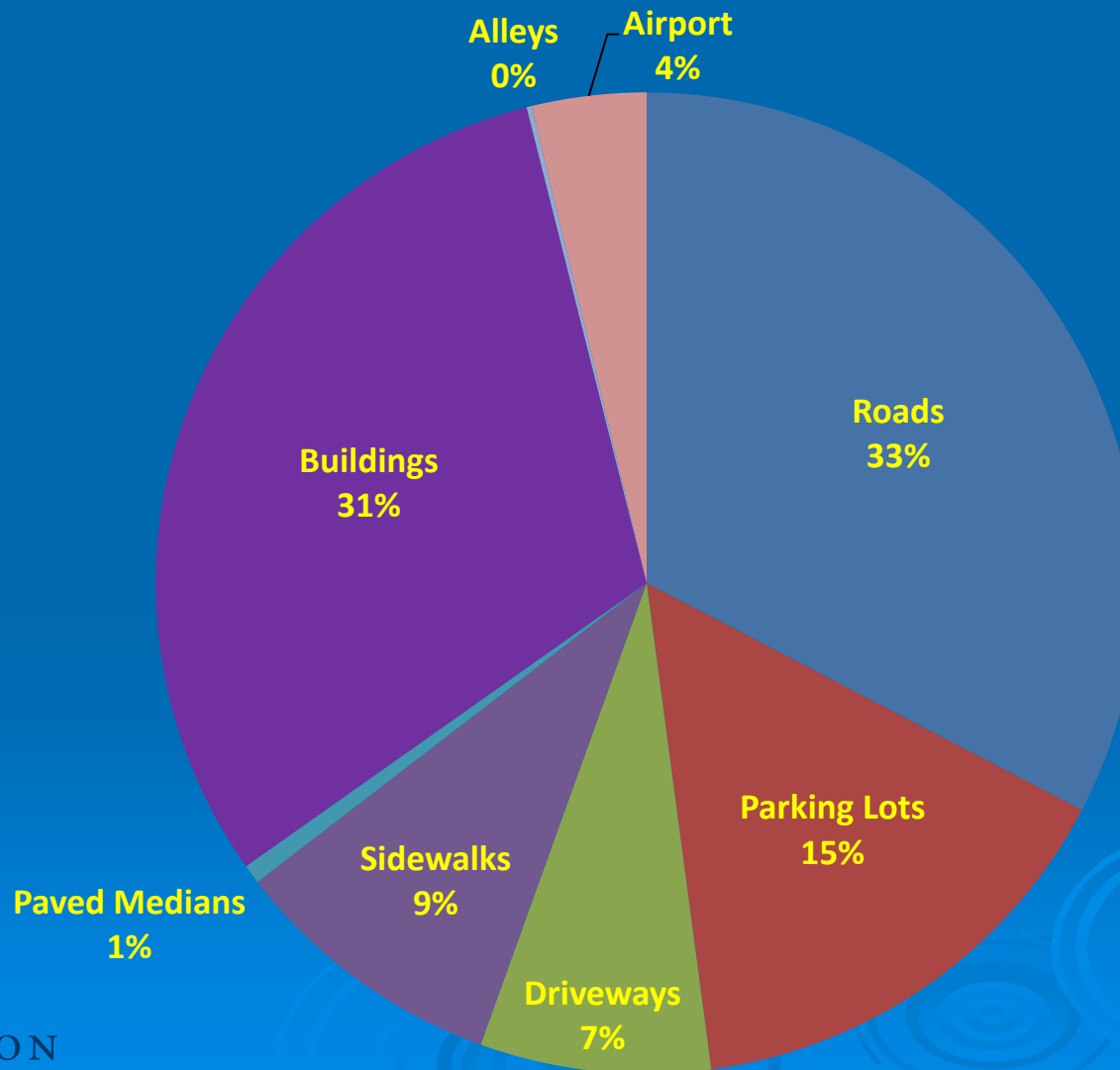


Arlington Watershed Facts



- 2010 Census: 207,627 people
- 26 square miles
- 7,972 persons/square mile
- 42% impervious cover
- 400 miles of storm sewers
- 28.5 miles of perennial streams
- Potomac River watershed

Arlington's Impervious Surfaces







CONTEXT

Chesapeake Bay TMDL & Arlington MS4 permit

Pollutant load reductions from 2009
baseline:

Nitrogen	-8%
Phosphorus	-14%
Sediment	-18%

Required load reduction schedule:

Permit cycle #1 (2013 – 2017)	5%
Permit cycle #2 (2018 – 2022)	35%
Permit cycle #3 (2023 – 2027)	60%

Sharing the 'loads'

- Bay TMDL and MS4 permit require reductions in overall stormwater pollution loads
- Development takes care of its pollution reduction obligations
- In parallel, municipality implements projects to reduce pollution from existing developed lands
- These efforts complement one another, share the pollution reduction burden equitably, and increase overall pollutant reductions

New State Stormwater Management Regulations

- Enacted in response to Bay TMDL
- Take effect State-wide July 1, 2014
- More stringent than current Arlington requirements
- Include pollution prevention requirements for construction phase
- VSMP permit registration for land disturbance >1 acre
- New Arlington Stormwater Management Ordinance for County Board adoption – Winter/Spring 2014

Water quality - Runoff Reduction Method

- Redevelopment: 20% net pollutant reduction for sites with >1 acre of land disturbance (vs 10% currently for all projects with >2500 SF of land disturbance)
- BUT, for any impervious area increases with redevelopment, the incremental increase must comply with the new development standard
- Runoff Reduction Method provides more credit for methods that reduce runoff volume (e.g., rain gardens, pervious paving, etc.)

Table 9.1. Summary of Stormwater Functions Provided by Bioretention Basins

Stormwater Function	Level 1 Design	Level 2 Design
Annual Runoff Volume Reduction (RR)	40%	80%
Total Phosphorus (TP) EMC Reduction ¹ by BMP Treatment Process	25%	50%
Total Phosphorus (TP) Mass Load Removal	55%	90%
Total Nitrogen (TN) EMC Reduction ¹ by BMP Treatment Process	40%	60%
Total Nitrogen (TN) Mass Load Removal	64%	90%

➤ Credit for pollutant removal by treatment AND runoff reduction

Drainage Area A Land Cover (acres)

	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.00	0.00	0.00
Impervious Cover (acres)	0.00	0.00	0.00	0.00	0.00
				Total	0.00

Apply Runoff Reduction Practices to Reduce Treatment Volume & Post-Development Load in Drainage Area A

Credit	Unit	Description of Credit	Credit	Credit Area (acres)	Volume from Upstream RR Practice (cf)	Runoff Reduction (cf)	Remaining Runoff Volume (cf)	Phosphorus Efficiency (%)	Phosphorus Load from Upstream RR Practices (lbs)	Untreated Phosphorus Load to Practice (lbs.)	Phosphorus Removed By Practice (lbs.)	Remaining Phosphorus Load (lbs.)	Downstream Treatment to be Employed
1. Vegetated Roof													
1.a. Vegetated Roof #1 (Spec #5)	acres of green roof	45% runoff volume reduction	0.45	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
1.b. Vegetated Roof #2 (Spec #5)	acres of green roof	60% runoff volume reduction	0.60	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2. Rooftop Disconnection													
2.a. Simple Disconnection to A/B Soils (Spec #1)	impervious acres disconnected	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.b. Simple Disconnection to C/D Soils (Spec #1)	impervious acres disconnected	25% runoff volume reduction for treated area	0.25	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.c. To Soil Amended Filter Path as per specifications (existing C/D soils) (Spec #4)	impervious acres disconnected	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.d. To Dry Well or French Drain #1 (Microinfiltration #1) (Spec #8)	impervious acres disconnected	50% runoff volume reduction for treated area	0.50	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
2.e. To Dry Well or French Drain #2 (Micro-Infiltration #2) (Spec #8)	impervious acres disconnected	90% runoff volume reduction for treated area	0.90	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
2.f. To Rain Garden #1 (Micro-Bioretenion #1) (Spec #9)	impervious acres disconnected	40% of volume captured	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
2.g. To Rain Garden #2 (Micro-Bioretenion #2) (Spec #9)	impervious acres disconnected	80% runoff volume reduction for treated area	0.80	0.00	0	0	0	50	0.00	0.00	0.00	0.00	
2.h. To Rainwater Harvesting (Spec #6)	impervious acres captured	based on tank size and design spreadsheet (See Spec #6)	0.00	0.00	0	0	0	0	0.00	0.00	0.00	0.00	
2.i. To Stormwater Planter (Urban Bioretenion) (Spec #9, Appendix A)	impervious acres disconnected	40% runoff volume reduction for treated area	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
3. Permeable Pavement													
3.a. Permeable Pavement #1 (Spec #7)	acres of permeable pavement + acres of "external" (upgradient) impervious pavement	45% runoff volume reduction	0.45	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
3.b. Permeable Pavement #2 (Spec #7)	acres of permeable pavement	75% runoff volume reduction	0.75	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
4. Grass Channel													
4.a. Grass Channel A/B Soils (Spec #3)	impervious acres draining to grass channels	20% runoff volume reduction	0.20	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to grass channels	20% runoff volume reduction	0.20	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
4.b. Grass Channel C/D Soils (Spec #3)	impervious acres draining to grass channels	10% runoff volume reduction	0.10	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to grass channels	10% runoff volume reduction	0.10	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
4.c. Grass Channel Compost Amended Soils as per specs (see Spec #4)	impervious acres draining to grass channels	30% runoff volume reduction	0.30	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
	turf acres draining to grass channels	30% runoff volume reduction	0.30	0.00	0	0	0	15	0.00	0.00	0.00	0.00	
5. Dry Swale													
5.a. Dry Swale #1 (Spec #10)	impervious acres draining to dry swale	40% runoff volume reduction	0.40	0.00	0	0	0	20	0.00	0.00	0.00	0.00	
	turf acres draining to dry swale	40% runoff volume reduction	0.40	0.00	0	0	0	20	0.00	0.00	0.00	0.00	
5.b. Dry Swale #2 (Spec #10)	impervious acres draining to dry swale	60% runoff volume reduction	0.60	0.00	0	0	0	40	0.00	0.00	0.00	0.00	
	turf acres draining to dry swale	60% runoff volume reduction	0.60	0.00	0	0	0	40	0.00	0.00	0.00	0.00	
6. Bioretenion													
6.a. Bioretenion #1 or Urban Bioretenion (Spec #9)	impervious acres draining to bioretenion	40% runoff volume reduction	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
	turf acres draining to bioretenion	40% runoff volume reduction	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00	
6.b. Bioretenion #2 (Spec #9)	impervious acres draining to bioretenion	80% runoff volume reduction	0.80	0.00	0	0	0	50	0.00	0.00	0.00	0.00	
	turf acres draining to bioretenion	80% runoff volume reduction	0.80	0.00	0	0	0	50	0.00	0.00	0.00	0.00	

Flood protection/channel protection

- More H/H analysis, including downstream analysis
- Energy balance option in-lieu of downstream analysis
 - More stringent than current Arlington requirements
 - Evaluating case studies to determine how much more stringent
- Runoff reduction practices also provide credit toward quantity control
- Increased protection of downstream properties from volume increases

Equation 10.2. Energy Balance Equation

$$Q_{Developed} \leq I.F. \times (Q_{Pre-Developed} \times RV_{Pre-Developed}) / RV_{Developed}$$

Where:

$Q_{Developed}$ = The allowable peak flow rate of runoff from the developed site

$I.F.$ = Improvement factor, equal to 0.8 for sites > 1 acre or 0.9 for sites \leq 1 acre

$Q_{Pre-Developed}$ = The peak flow rate of runoff from the site in the pre-developed condition

$RV_{Pre-Developed}$ = The volume of runoff from the site in the pre-developed condition

$RV_{Developed}$ = The volume of runoff from the site in the developed site

Accounts for
impacts of
increased
flow and
volume

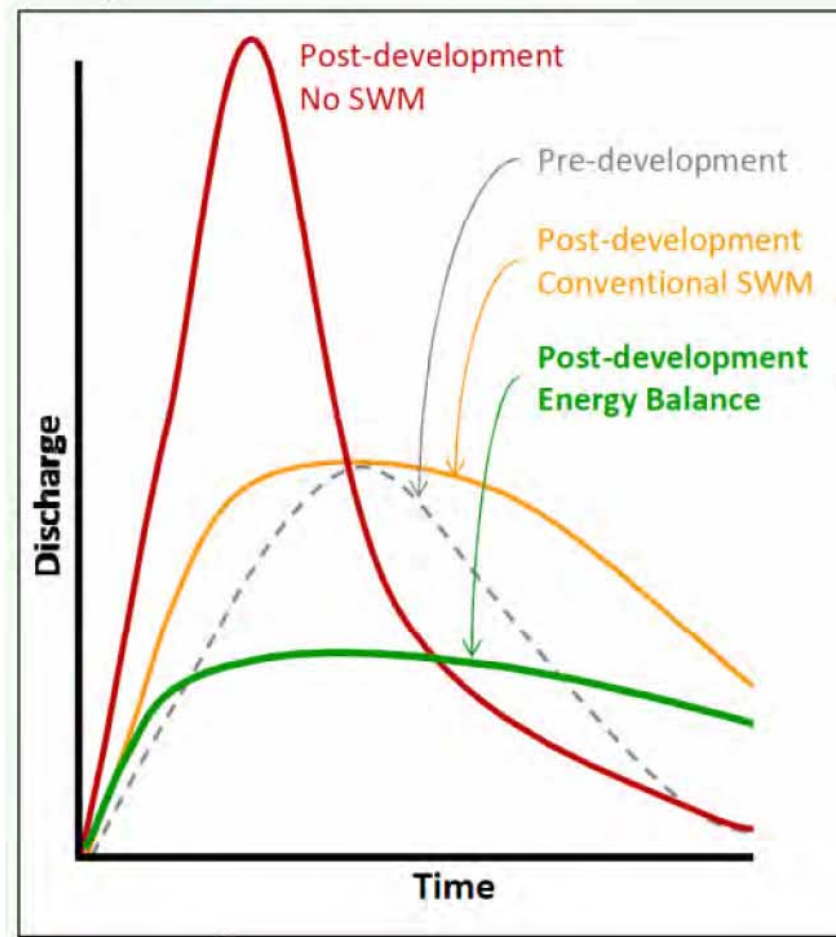


Figure 11.5. Theoretical Runoff and Discharge Hydrographs (Source: WSSI 2011b)

Construction phase

- Pollution Prevention Plan to address potential pollution sources other than sediment
- Reinforces requirements of MS4 permit that prohibits most non-stormwater discharges
- Detailed inspection/compliance logs, including stormwater facility construction

Some fine print

Only the following non-stormwater discharges are authorized by Arlington County's MS4 permit, unless the State Water Control Board, the Virginia Soil and Water Conservation Board (Board), or Arlington County determines the discharge to be a significant source of pollutants to surface waters:

Water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)); uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensation; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; discharges or flows from fire fighting; and, other activities generating discharges identified by the Department of Environmental Quality as not requiring VPDES authorization.

Appropriate controls must be implemented to prevent any non-stormwater discharges not included on the above list (e.g., concrete wash water, paint wash water, vehicle wash water, detergent wash water, etc.) from being discharged into Arlington County's MS4 system, which includes the curb and gutter system, as well as catch basins and other storm drain inlets, or stream network.

Parting Thoughts

- Stormwater management has entered a new and much more stringent era
- Educate yourself (builders, developers, A/E teams, etc.)
- Consider stormwater compliance strategies at the earliest stages of design
- Be prepared for significant challenges
- There are synergies with Green Building/LEED that can be maximized

Arlington Green Building Program

- Encourages developers to build high performance buildings that reduce environmental impacts
- Voluntary program uses the LEED® green building rating system to evaluate each project
- Grants bonus densities to projects that achieve minimum levels of LEED certification and energy performance.
- Incentive program adopted in 2000, then updated and expanded in 2003, 2009 & 2012
- More info at: <http://bit.ly/ACGreenBuilding>

Key stormwater synergies include green roofs and rainwater harvesting – multiple LEED credit potential

Pentagon – largest green roof in Arlington



Walter Reed Community Center



Wakefield High School – rainwater capture to irrigate/flush toilets



Navy League – rainwater capture to flush toilets



Green Building Bonus Density Program

New development project teams may request additional bonus density and/or height in exchange for a minimum level of energy savings and LEED green building certification as follows:

LEED Level	Prior to June 16, 2012		After June 16, 2012	
	Office	Residential	Office – 20% EE	Residential – 18% EE
Certified	0.05 FAR	0.10 FAR	n/a	n/a
Silver	0.15 FAR	0.20 FAR	0.20 FAR	0.25 FAR
Gold	0.35	0.4	0.35	0.4
Platinum	0.45	0.5	0.45	0.5

Energy Efficiency (EE) – All levels of LEED certification, Silver, Gold, and Platinum, will require the minimum level of energy savings above the baseline ASHRAE 90.1-2007 standard as defined under LEED EA credit 1 – *Optimize Energy Performance* in the LEED 2009 rating system.



08/22/2012



www.arlingtonva.us Search 'stormwater'
jpapacosma@arlingtonva.us
703 228 3613

09/29/2010



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WBC REGIONAL SUSTAINABILITY UPDATE

Questions & Answers

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WASHINGTON BUILDING CONGRESS

The Washington Building Congress is a professional trade association made up of over 1,000 companies and individuals from a variety of disciplines, all with an active interest or involvement in the Washington metropolitan area real estate, design and construction community.

The WBC was established in 1937 as an "*umbrella organization*" to represent the collective interests of the industry, provide education and networking opportunities, and promote the professional advancement of our members.