VIRGINIA STORMWATER REGULATORY PROGRAM IMPLEMENTATION

Kimley-Horn and Associates, Inc.
Karl Mertig, PWD
Greta Hawkins, P.G.
Robyn Niss, P.E.

the city of Hampton virginia

TUESDAY | SEPTEMBER 24, 2013

Kimley-Horn and Associates, Inc.

Today's Agenda

- Overview of Virginia Stormwater Regulations
- Hampton's Stormwater Program Organizational Changes
- Overview of the Runoff Reduction Method (RRM)
- Questions and Answers

Regulation of Runoff in Virginia

EPA → DEQ → Hampton

- Environmental Protection Agency (EPA)
  - Delegates stormwater program responsibilities to Virginia
  - Provides oversight for:
    - Total Maximum Daily Load (TMDL) Implementation
    - Municipal Separate Storm Sewer System (MS4) Permit
    - Industrial Stormwater Permits
    - State Construction General Permit (CGP)

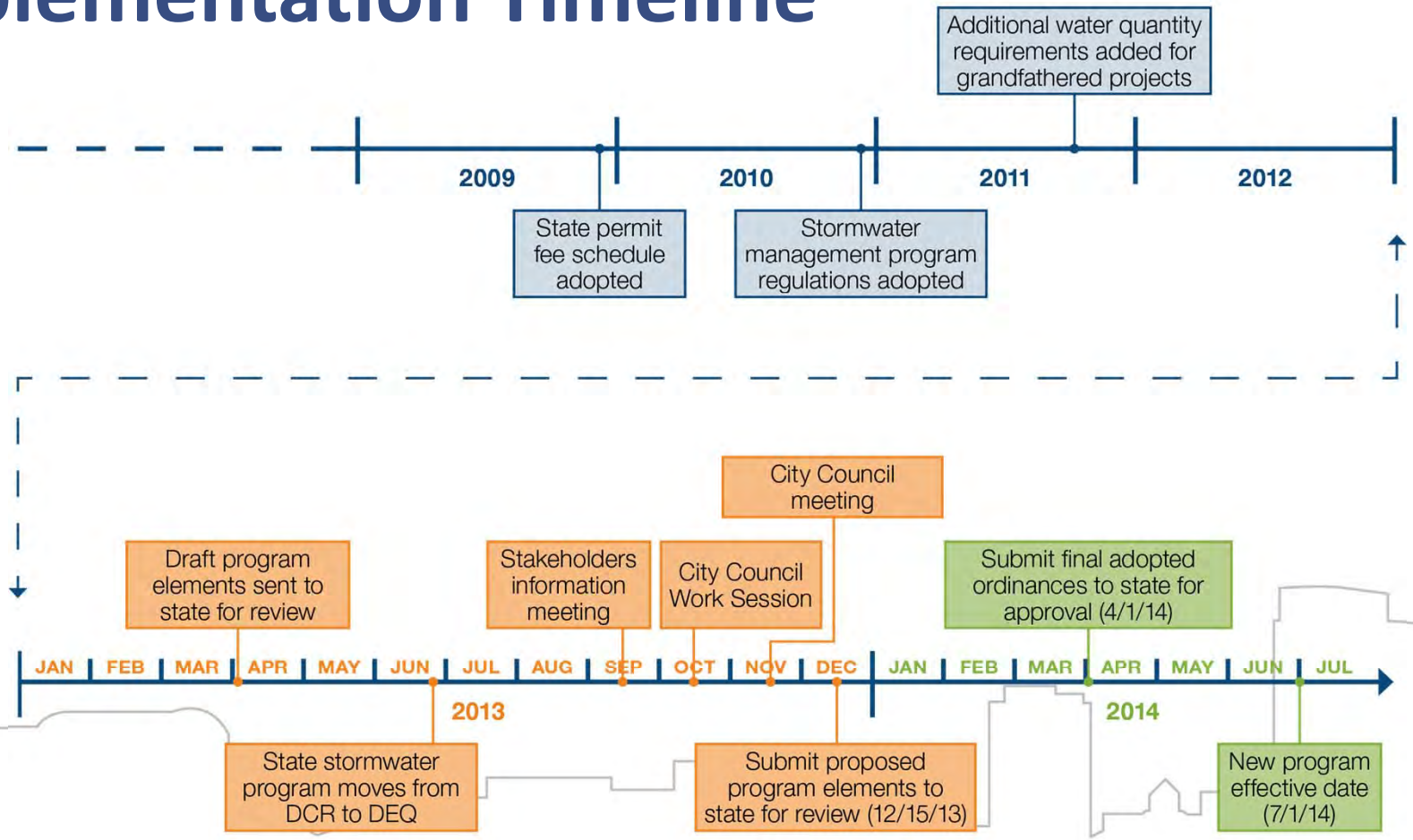
EPA → DEQ → Hampton

- Virginia Department of Environmental Quality (DEQ)
  - Implements regulations directly
    - Industrial Stormwater Permits
    - State CGP Issuance
  - Delegates and oversees implementation of certain regulations to City of Hampton:
    - Erosion and Sediment Control Program
    - Stormwater Management Program
    - State CGP Enforcement

EPA → DEQ → Hampton

- City of Hampton
  - Implement/enforce programs as required by DEQ through:
    - Land Disturbing Operations ordinance (Erosion & Sediment Control)
    - Stormwater Management ordinance
    - MS4 Permit
  - Enforce Virginia's CGP

Implementation Timeline



Hampton's Responsibilities:

- December 15, 2013
  - Submit program elements to DEQ
    1. Stormwater Management Ordinance
    2. Policies/Procedures
    3. Enforcement Program
    4. Final Staffing and Funding Plan
- April 1, 2014
  - Submit final adopted Stormwater Management ordinance to DEQ
- July 1, 2014 – effective date for new stormwater program

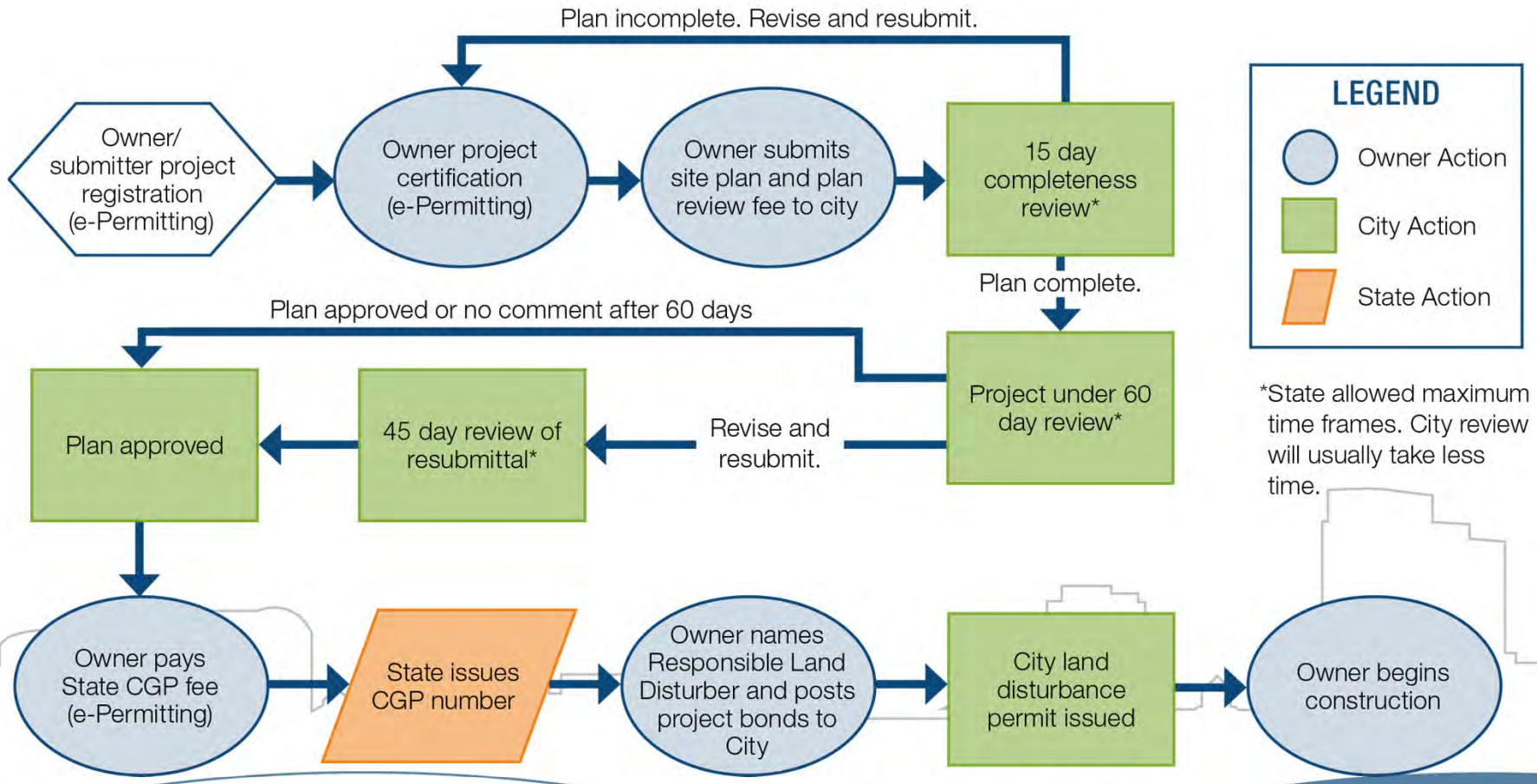
Stormwater Program Changes

- Revised policies/procedures for:
  - Reporting/coordination with DEQ
  - Plan review
  - Permitting
  - Inspections
  - Enforcement

Reporting/Coordination with DEQ

- e-Permitting System
  - Coordination between owner/developer, Commonwealth, and City
  - Coordination and tracking of plan review process
  - Method for State CGP issuance
  - Collection of fee for State CGP (pay online)
  - BMP tracking
  - Online mapping tool (GIS)

e-Permitting Process



Plan Review

Current:

- Erosion and Sediment (E&S) Control Plan
- Stormwater Management Plan (MS-19, CBPA)

Proposed:

- Grandfathering status determines review
  - RRM or MS-19/CBPA
- e-Permitting

Stormwater Calculations After July 1, 2014

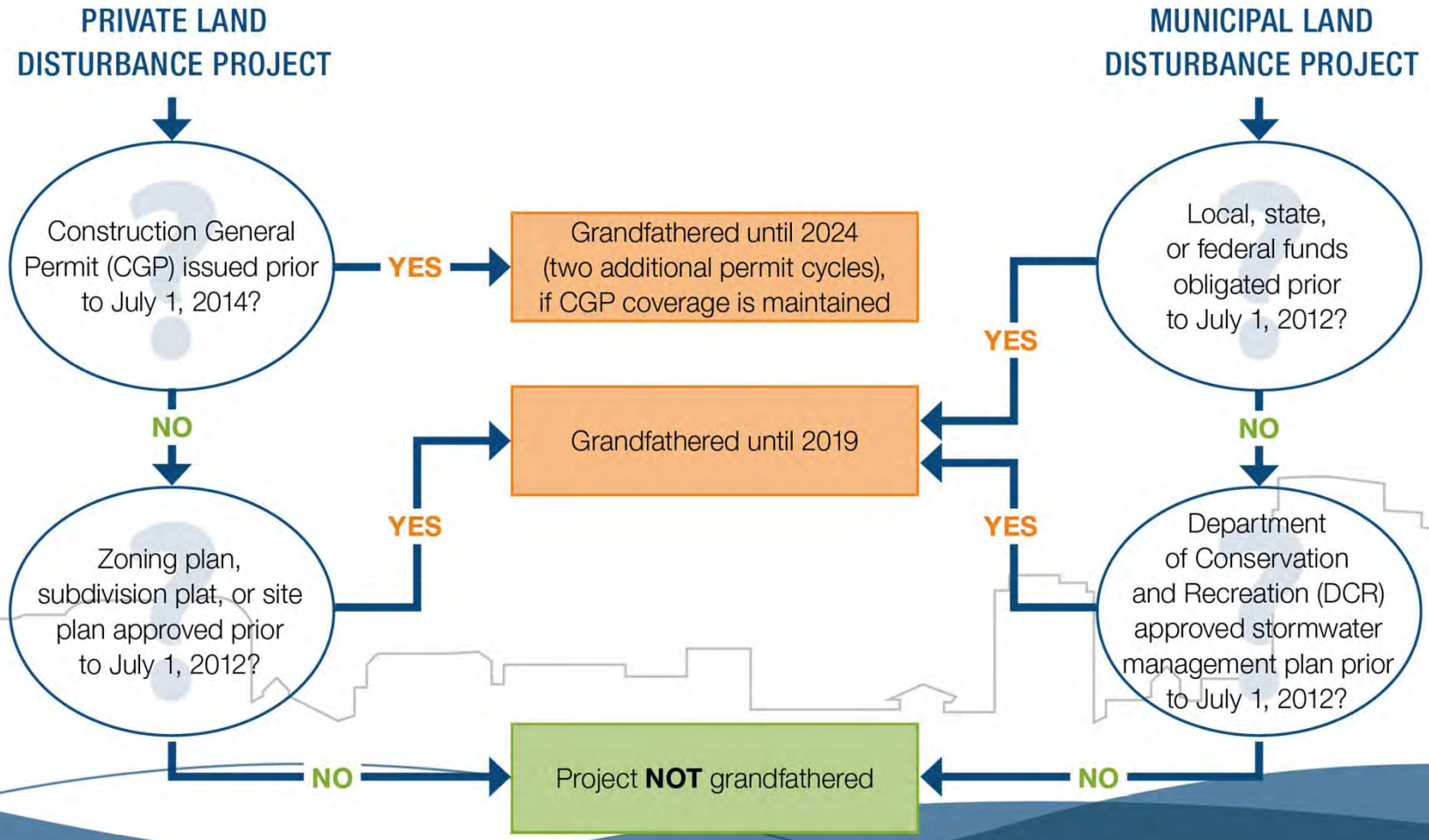
Technical criteria of Part II B. (new projects)

- Water quality
  - Runoff Reduction Method (RRM)
- Water quantity
  - Channel protection
  - Flood protection

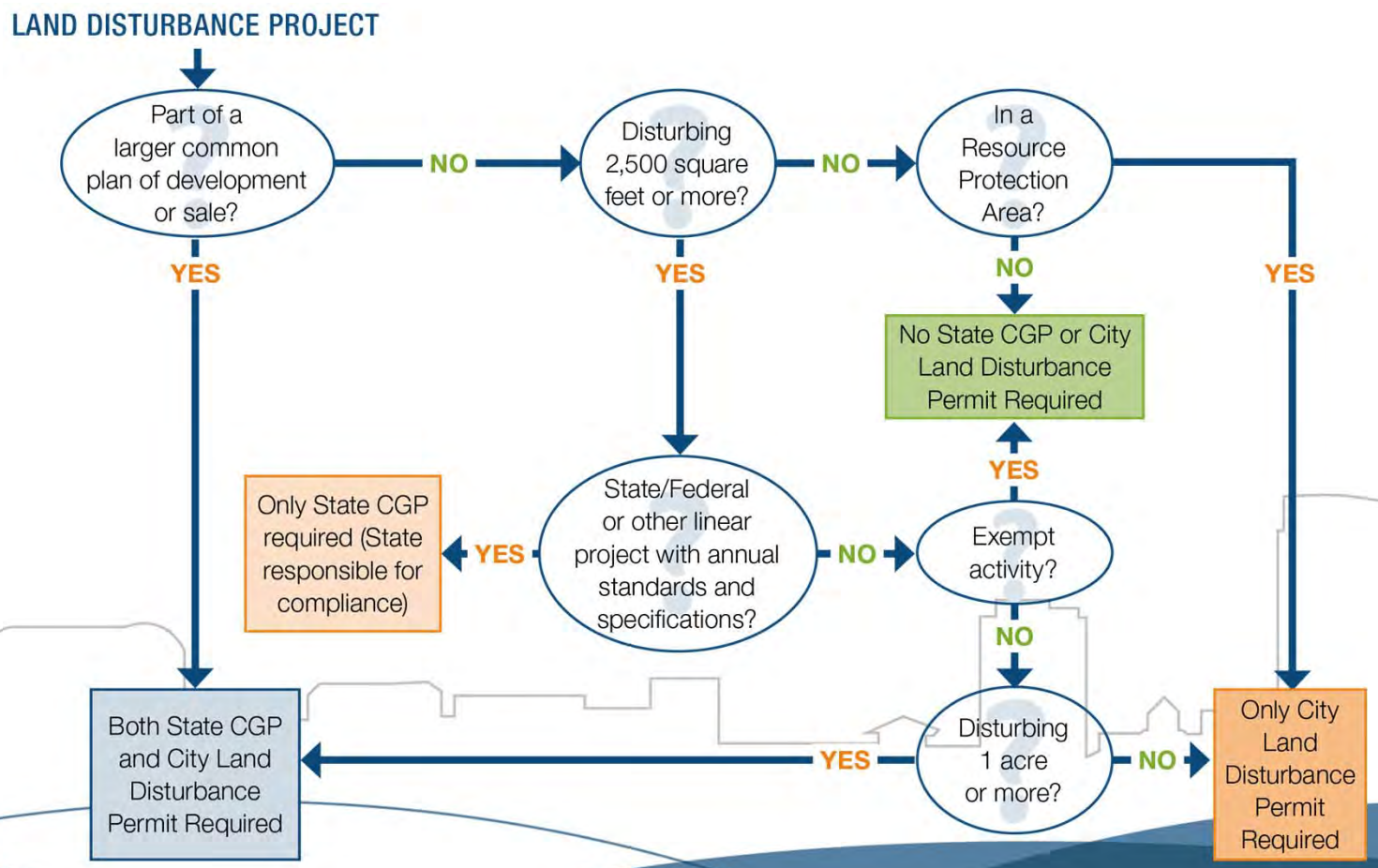
Technical criteria of Part II C. (grandfathered projects)

- Water quality
  - Chesapeake Bay Preservation Act (CBPA) calculations
- Water quantity
  - Stream channel erosion
  - Flooding

Process for Grandfathering from the New Technical Criteria

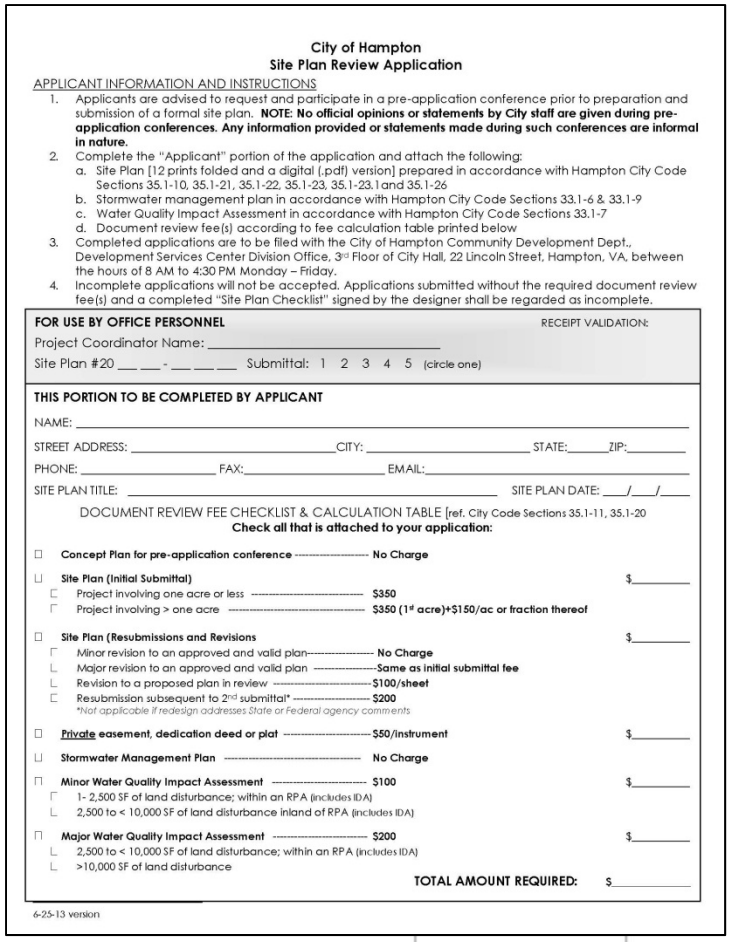


Permit Determination Process



Permitting

- Required for issuance of Land Disturbing Permit by Hampton:
  - Evidence of State CGP coverage – if required
  - Approved Development Plan – if required
  - Post required bonds
  - Identify Responsible Land Disturber (RLD)



City of Hampton
Site Plan Review Application

APPLICANT INFORMATION AND INSTRUCTIONS

1. Applicants are advised to request and participate in a pre-application conference prior to preparation and submission of a formal site plan. **NOTE: No official opinions or statements by City staff are given during pre-application conferences. Any information provided or statements made during such conferences are informal in nature.**
2. Complete the "Applicant" portion of the application and attach the following:
   a. Site Plan [12 prints folded and a digital (.pdf) version] prepared in accordance with Hampton City Code Sections 35.1-10, 35.1-21, 35.1-22, 35.1-23, 35.1-23.1 and 35.1-26
   b. Stormwater management plan in accordance with Hampton City Code Sections 33.1-6 & 33.1-9
   c. Water Quality Impact Assessment in accordance with Hampton City Code Sections 33.1-7
   d. Document review fee(s) according to fee calculation table printed below
3. Completed applications are to be filed with the City of Hampton Community Development Dept., Development Services Center Division Office, 3rd Floor of City Hall, 22 Lincoln Street, Hampton, VA, between the hours of 8 AM to 4:30 PM Monday – Friday.
4. Incomplete applications will not be accepted. Applications submitted without the required document review fee(s) and a completed "Site Plan Checklist" signed by the designer shall be regarded as incomplete.

FOR USE BY OFFICE PERSONNEL RECEIPT VALIDATION:
Project Coordinator Name: _____
Site Plan #20 __ __ - __ __ __ Submittal: 1 2 3 4 5 (circle one)

THIS PORTION TO BE COMPLETED BY APPLICANT
NAME: _____
STREET ADDRESS: _____ CITY: _____ STATE: _____ ZIP: _____
PHONE: _____ FAX: _____ EMAIL: _____
SITE PLAN TITLE: _____ SITE PLAN DATE: ___/___/___

DOCUMENT REVIEW FEE CHECKLIST & CALCULATION TABLE [ref. City Code Sections 35.1-11, 35.1-20
Check all that is attached to your application:

- ☐ **Concept Plan for pre-application conference** ---------- **No Charge**
- ☐ **Site Plan (Initial Submittal)** $_____
  - Project involving one acre or less ---------- **$350**
  - Project involving > one acre ---------- **$350 (1st acre)+$150/ac or fraction thereof**
- ☐ **Site Plan (Resubmissions and Revisions** $_____
  - Minor revision to an approved and valid plan---------- **No Charge**
  - Major revision to an approved and valid plan ----------**Same as initial submittal fee**
  - Revision to a proposed plan in review ----------**$100/sheet**
  - Resubmission subsequent to 2nd submittal* ---------- **$200**
  - **Not applicable if redesign addresses State or Federal agency comments*
- ☐ **Private easement, dedication deed or plat** ---------- **$50/instrument** $_____
- ☐ **Stormwater Management Plan** ---------- **No Charge**
- ☐ **Minor Water Quality Impact Assessment** ---------- **$100** $_____
  - 1- 2,500 SF of land disturbance; within an RPA (includes IDA)
  - 2,500 to < 10,000 SF of land disturbance inland of RPA (includes IDA)
- ☐ **Major Water Quality Impact Assessment** ---------- **$200** $_____
  - 2,500 to < 10,000 SF of land disturbance; within an RPA (includes IDA)
  - >10,000 SF of land disturbance

TOTAL AMOUNT REQUIRED: $_____

6-25-13 version

Construction Phase Compliance Inspections

- City will inspect for:
  - Implementation of Stormwater Pollution Prevention Plan (SWPPP)
    - Approved Erosion & Sediment Control Plan
    - Approved Stormwater Management Plan
    - Pollution Prevention Plan
  - Installation of permanent stormwater management facilities

Commander Shepard Boulevard Ext. Phase II, Hampton, VA

Filter bag, Armistead Bridge Road, Norfolk, VA

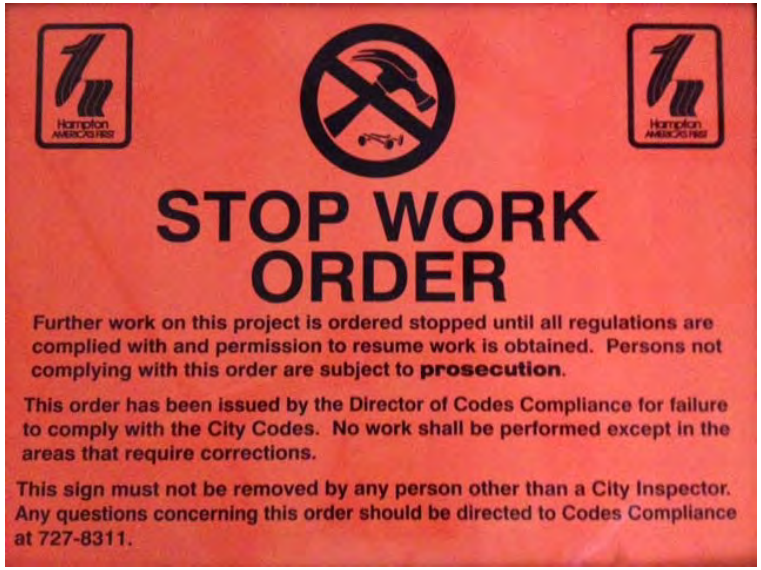
Construction Phase Compliance Inspections

- SWPPP on-site
- Completed contractor certification forms
- Completed self inspection reports
- Pollution Prevention Plan:
  - Equipment/vehicle maintenance and washing
  - Material storage
  - Fueling tanks/spill clean-up
  - Concrete washout
  - Trash cans/dumpsters
  - Portable toilets

Post Construction Inspections

- City maintained stormwater management facilities
  - City to inspect at least once every 5 years
- Privately owned stormwater management facilities
  - Owner required to inspect at least once every 5 years
  - Inspection report signed and sealed by licensed professional and submitted to City
- Inspection reports can be audited by DEQ and EPA

Enforcement



- Failure to comply with regulations
  - Verbal warnings and inspection reports
  - Notice to comply
  - Notice of Corrective Action
  - Stop Work Orders
  - Formal administrative enforcement:
    - Consent Special Orders
      - Civil penalties not to exceed $32,500 per violation per day
    - Criminal misdemeanor

Proposed Permit Fees

State Construction General Permit and E-Permitting

Land Disturbance Acreage	State CGP Fee
Less than one acre within common plans of development or sale	$ 81
Equal to or greater than one acre and less than five acres	$ 756
Equal to or greater than five acres and less than 10 acres	$ 952
Equal to or greater than 10 acres and less than 50 acres	$ 1,260
Equal to or greater than 50 acres and less than 100 acres	$ 1,708
Equal to or greater than 100 acres	$ 2,688

Proposed City Land Disturbance Permit Fees

Land Disturbance Area	City Land Disturbance Permit fee
Less than 2,500 square feet out of the RPA	No charge and no permit required
Less than 2,500 square feet in the RPA	$ 175
2,500 square feet-but less than 0.25 acres	$ 175
0.25 acres-but less than 0.50 acres	$ 225
0.50 acres-but less than 0.75 acres	$ 275
0.75 acres-but less than 1.0 acres	$ 290
1.0 acres-but less than 5.0 acres	$ 1,944
5.0 acres-but less than 10.0 acres	$ 2,448
10.0 acres-but less than 50.0 acres	$ 3,240
50.0 acres-but less than 100.0 acres	$ 4,392
100.0 acres or greater	$ 6,912
An agreement in lieu of a plan	$ 75

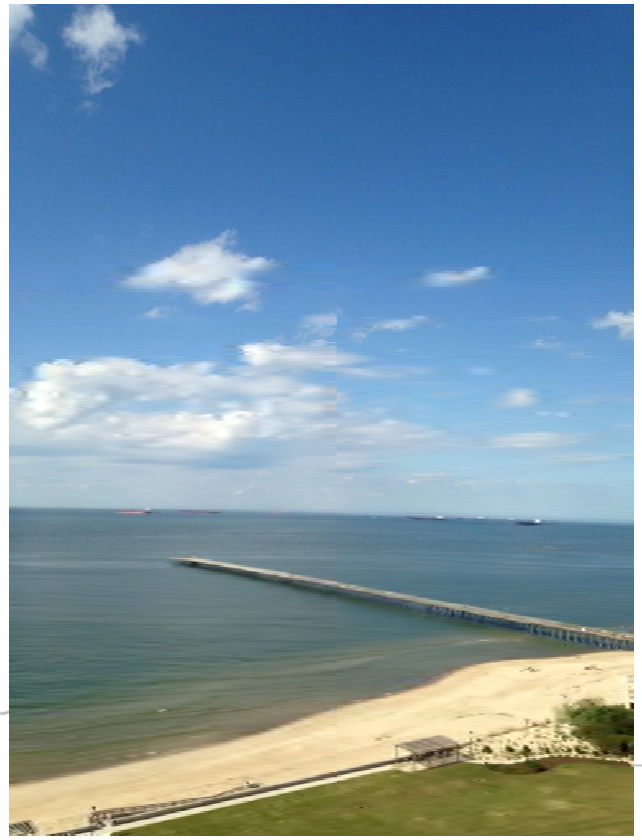
CGP Maintenance Fees

Current fees	Proposed fees (after July 1, 2014)
No permit maintenance (yearly renewal) fee	City has decided to NOT charge maintenance fees
	State CGP Notice of Termination required for release of project bonds

Stormwater Technical Criteria

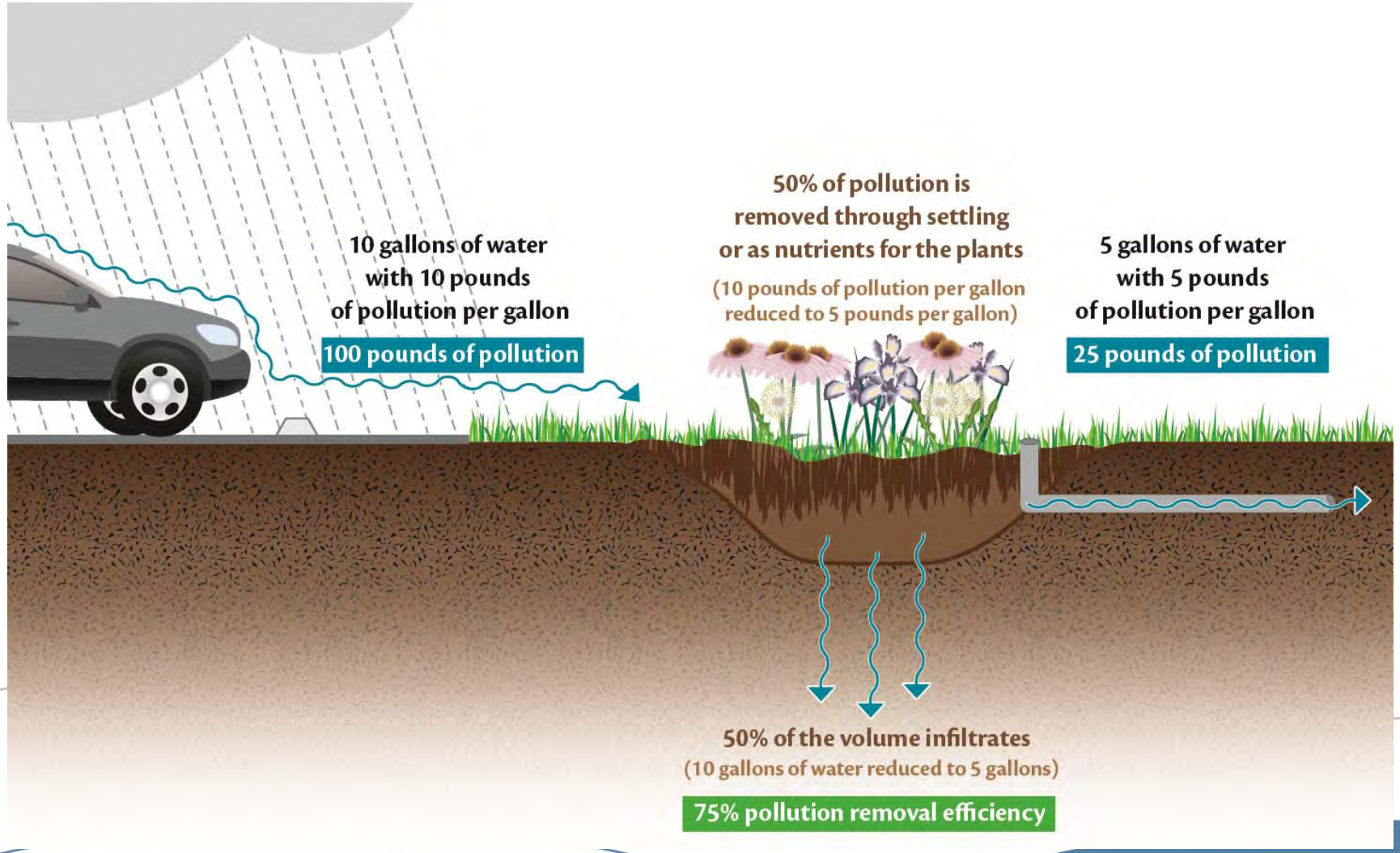
- Why use the Runoff Reduction Method (RRM)?
- Pollutant loading targets
- Things to consider
- Examples
- Virginia BMP Clearinghouse Website
- Stormwater quantity control
- One more example

Why use the Runoff Reduction Method?



- New calculation method required for stormwater quality compliance
- Required by July 1, 2014 per Virginia regulations

The Runoff Reduction Method



Why Use the Runoff Reduction Method?

- Chesapeake Bay Preservation Act (CBPA) calculations
  - Pollutant removal efficiencies for <u>treatment only</u>
- Runoff Reduction Method (RRM)
  - Pollutant removal efficiencies for:
    - <u>Treatment</u>
    - <u>Runoff reduction</u>
  - Low Impact Design BMPs
  - Meets Chesapeake Bay TMDL

Phosphorous (P) Removal Targets

- Consistent rates statewide
- New development
  - Loading P target – 0.41 lbs/acre
- Redevelopment
  - 10% P reduction for < 1 acre
  - 20% P reduction for > 1 acre

Phosphorous (P) Generation Rates

CBPA – 2.17 lbs/acre impervious, 0.11 lbs/acre pervious

- Forest and Open Space – **<u>0.05-0.11 lbs/acre</u>**
  - Wetlands, BMPs
  - Yards undisturbed during construction
  - Open space, bush hogged ≤ 4x/year
- Managed turf – **<u>0.34-0.57 lbs/acre</u>**
  - Mowed and maintained turf
- Impervious area – **<u>2.17 lbs/acre</u>**
  - Impervious cover
  - Surface area of wet ponds
  - Surface areas of BMPs that replace impervious area (green roof, permeable pavement)

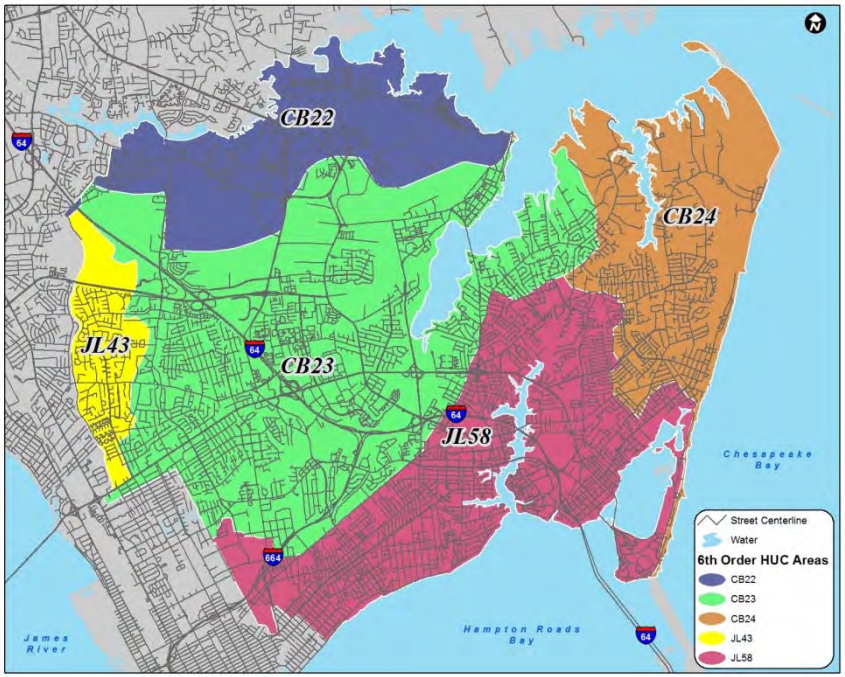
protected forest/open space or reforested land	0.00	0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00
Impervious Cover (acres)	0.00	0.00

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

Rv Coefficients		
	A soils	B Soils
Forest/Open Space	0.02	0.03
Managed Turf	0.15	0.20
Impervious Cover	0.95	0.95

Additional Input Characteristics

- Use land disturbance, not parcel area
- Soil type – Hydrologic soil group
- Localized rainfall data
- Outfall per Hydrologic Unit Codes (HUC)
- Coastal plain considerations



Example 1
New development

Total Site – 2 acres

Pre-development impervious cover – 0 acres

Post-development impervious cover – 1.5 acres

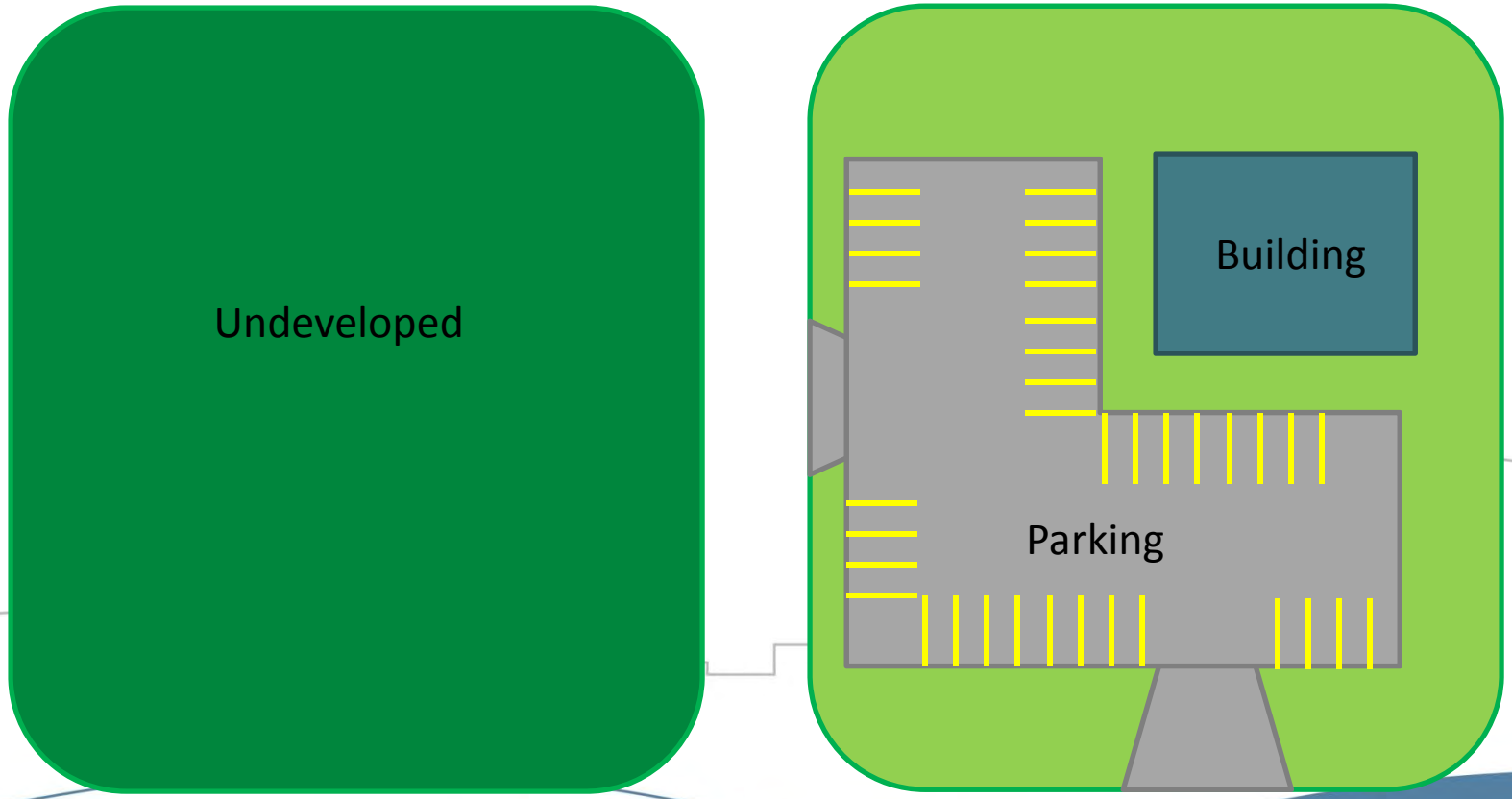
<u>Additional information for RRM</u>

Type C soils

Pre-developed pervious area is undisturbed open space

Post-developed pervious area is managed turf

Example 1
New development



Example 1
New development

CBPA	RRM
Situation 2 – New Development	New Development Spreadsheet
Pre-Developed Load based on watershed impervious cover (34%) = 1.62 lbs	Pre-Developed Load based on target phosphorus load = 0.82 lbs
Post-Developed Load = 3.31 lbs	Post-Developed Load = 3.50 lbs
Required Pollutant Removal = 3.31-1.62 = 1.68 lbs	Required Pollutant Removal = 3.50-0.82 = 2.68 lbs

Example 2
Redevelopment

Total Site – 2 acres

Pre-Development Impervious Cover – 1.0 acres

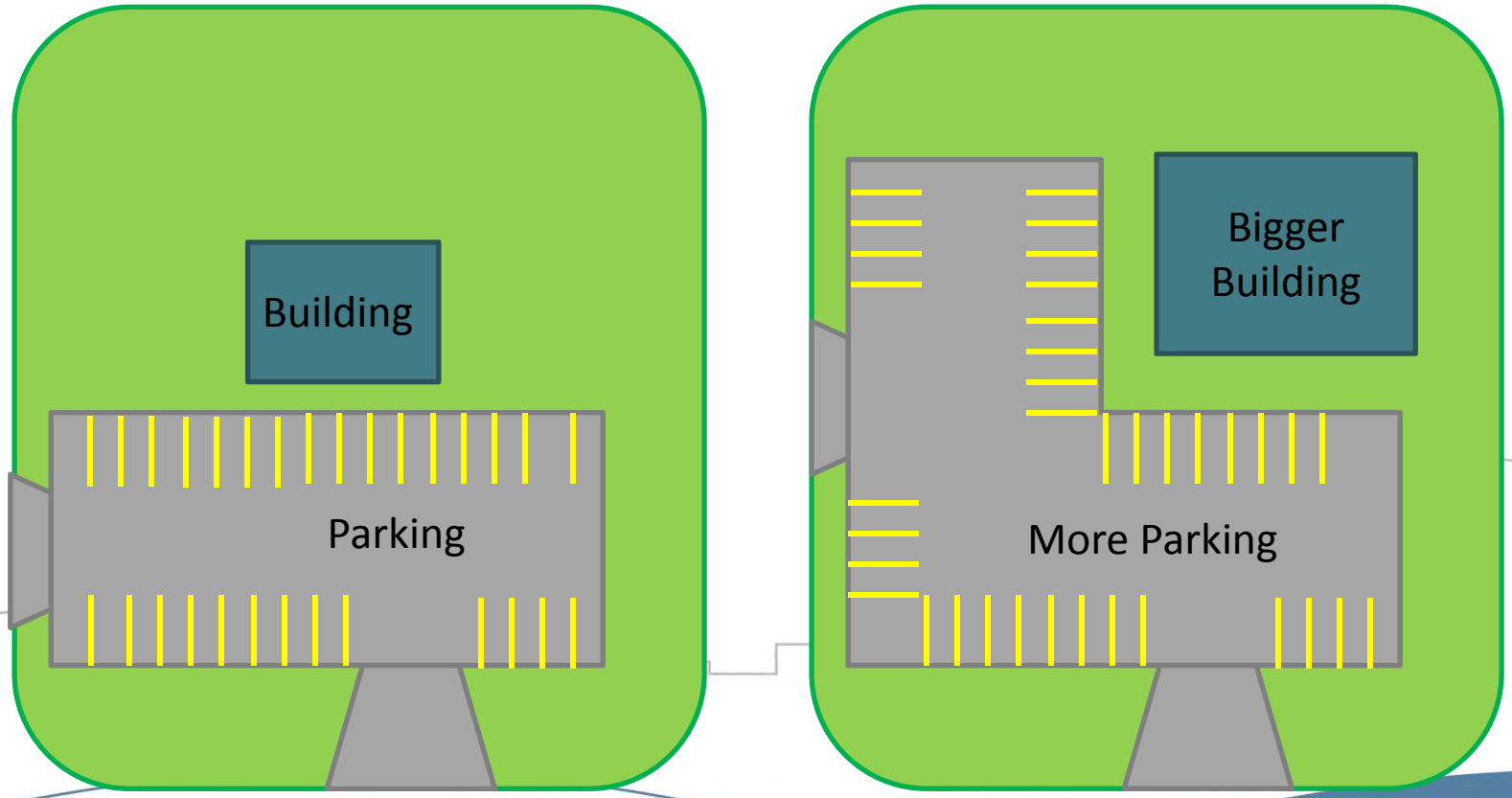
Post-Development Impervious Cover – 1.5 acres

<u>Additional Information for RRM</u>

Type C Soils

Pre- and Post-Developed pervious area is managed turf

Example 2
Redevelopment



Example 2 Redevelopment

CBPA

Situation 3 – Redevelopment

Pre-Developed Load based on impervious cover = 2.28 lbs

Post-Developed Load = 3.31 lbs

Required Pollutant Removal = (3.31-2.28*90%)=1.25 lbs

RRM

Redevelopment Spreadsheet

New Development (0.5 ac. imp. area)

Target = 0.20, Post Load = 1.08

Removal Req'd= 1.08-0.20= 0.88

Redevelopment (1 ac. imp. / 0.5 ac. turf)

Pre = Post Load = 2.42

Removal Req'd=20%= 0.48 lbs

Total Pollutant Removal Required = 0.88+0.48 lbs = 1.36 lbs

Virginia BMP Clearinghouse Website

- Online resource for Best Management Practices (BMP) design
- Wider range of BMPs
- Phosphorus and nitrogen removal guidance
- Design criteria
- Typical details
- Regional adaptations
- Construction and maintenance information

BMP	P Removal Efficiency from CBPA	P Removal Efficiency from RRM	Removal from Runoff Reduction	Removal from Treatment
Wet Pond	**50%-65%**	**45%-65%**	0	45%-65%
Dry Pond	**35%-50%**	**15%-31%**	0-15%	15%
Constructed Wetlands	**30%**	**50%-75%**	0	50%-75%
Infiltration	**50%**	**63%-93%**	50%-90%	25%
Bioretention	**50%**	**55%-90%**	40%-80%	25%-50%
Vegetated Roof	**N/A**	**45%-60%**	45%-60%	0
Permeable Pavement	**N/A**	**59%-81%**	45%-75%	25%

Stormwater Quantity

Water Quantity

Channel Protection

Flood Protection

Stormwater Quantity for Grandfathered Projects

- Stream Channel Erosion
  - Detention of 1-year 24-hour storm

Stormwater Quantity for New Projects

Channel Protection

- Manmade stormwater conveyance system
  - Peak flow from the 2-year 24-hour storm must not cause erosion
- Natural stream or restored conveyance system
  - Hold 1-year post-developed peak flow rate to pre-developed levels

<u>AND</u>

  - Hold Q*Vpost to 80% or 90% of Q*Vpre (depending on size of disturbed area)

Stormwater Quantity for New Projects

Channel Protection Analysis Limits

- Site's contributing drainage area ≤ 1% of total watershed area
- Site's 1-year peak flow ≤ 1% of the existing peak flow
- "Energy Balance Equation"
  - Q*Vpost to 80% or 90% of Q*Vpre

Stormwater Quantity for Grandfathered Projects

Flooding

- 10-year post-developed rate ≤ 10-year pre-developed rate

Stormwater Quantity for New Projects

Flood Protection

- System does not currently experience localized flooding in the 10-year storm
  - Confine the 10-year flow within the system
- System does currently experience localized flooding in the 10-year storm
  - Confine the 10-year flow within the system to avoid flooding

  <u>OR</u>
  - Hold the 10-year post flow to pre- levels

Stormwater Quantity for New Projects

Flood Protection Analysis Limits

- Site's contributing drainage area ≤ 1% of total watershed area
- 10-year peak flow from the site ≤ 1% of the existing peak flow
- A mapped floodplain
- Hold the 10-year post flow to pre- levels

Example 3 Quality and Quantity Control

- Proposed gas station – redevelopment on a 2.2-acre site
- Pre-development – 0.4-acres open space, 1.8-acres impervious
- Post Development – 0.6-acres turf, 1.6-acres impervious

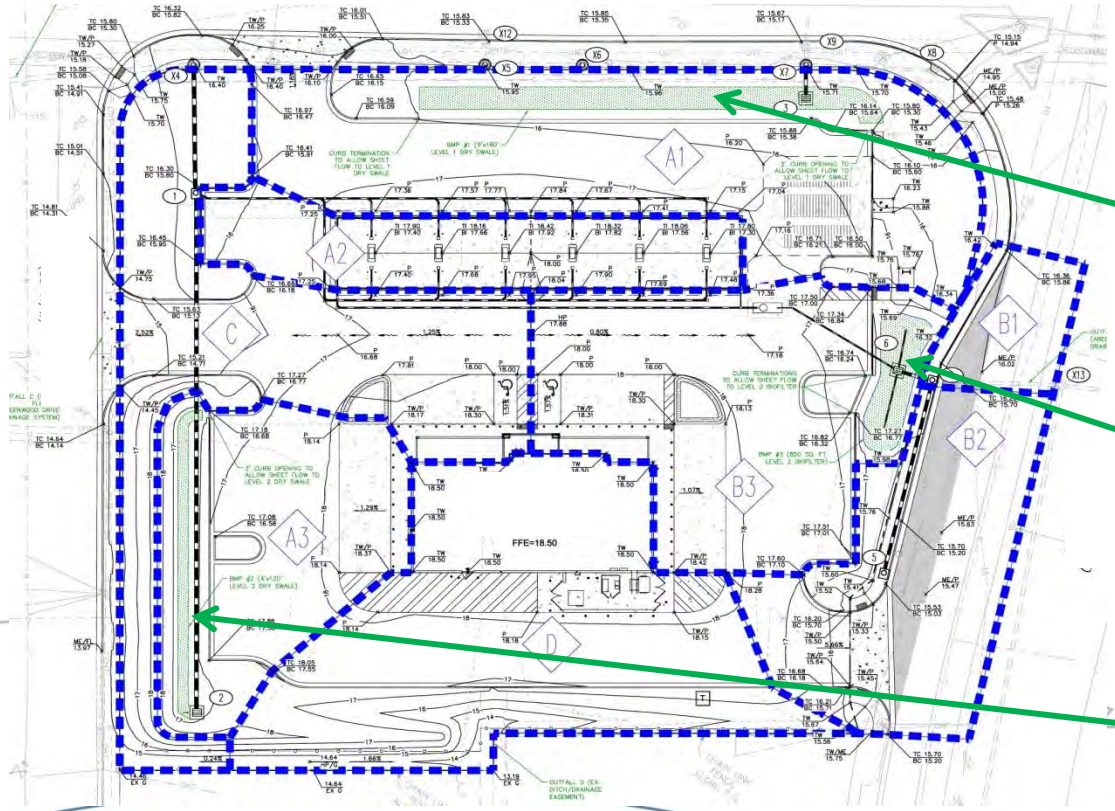
<u>Grandfathered</u>

- No BMP for quantity or quality based on reduction in impervious cover

<u>New Criteria</u>

- 0.72 lbs/year phosphorus removal required
- Energy balance equation for SW quantity

Example 3
Quality and Quantity Control



<u>New Criteria</u>

Quality and quantity met by RRM practices

0.25-acres impervious, 0.18-acres pervious Level 1 swale (0.31 lbs/yr)

0.28-acres impervious, 0.05-acres pervious Level 2 bioretention (0.59 lbs/yr)

0.15-acres impervious, 0.08-acres pervious Level 2 swale (0.28 lbs/yr)

Example 3
Quality and Quantity Control

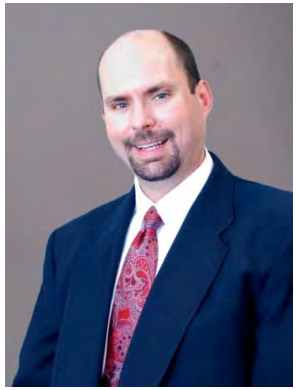
- Estimated added construction cost ~ $65,000
- Other additional costs:
  - Infiltration testing
  - Stormwater design
  - Long term maintenance
- If used new criteria from beginning, resulting site plan and selected stormwater management features may have been quite different.

Conclusion

- Retrofitting new criteria to old way of designing a site is not the most cost effective method.
- New criteria require a fresh design approach from conceptual planning.

Owners, Designers, and Contractors will need to think, budget, and act differently to meet the new technical criteria.

THANK YOU!



Karl Mertig, CPWD

Greta Hawkins, P.G.

Robyn Niss, P.E., LEED AP