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VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY

Stormwater Permitting in Virginia Monitoring / Modeling Requirements

National Stormwater Roundtable – San Antonio, TX

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Presentation Outline

- Industrial Stormwater Permitting (discharge monitoring)
- Construction Stormwater Permitting (discharge modeling)
- Additional Resources
- Questions & Answers

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Industrial Stormwater Permitting

- Chesapeake Bay Total Maximum Daily Load (TMDL)
  - Established December 29, 2010 (TN, TP, TSS)
  - Includes aggregate wasteload allocation for VPDES permitted industrial stormwater facilities
  - Total Nitrogen (TN) – 12.3 lb TN/ac/yr
  - Total Phosphorus (TP) – 1.5 lb TP/ac/yr
  - Total Suspended Solids (TSS) – 440 lb TSS/ac/yr

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Industrial Stormwater Permitting

- Discharges to waters subject to the Chesapeake Bay TMDL
  - Monitoring & reporting to DEQ to characterize the discharge(s)
  - 4 samples collected on a semi-annual basis
  - Total Nitrogen (TN)
  - Total Phosphorus (TP)
  - Total Suspended Solids (TSS)

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Industrial Stormwater Permitting

- Discharges to waters subject to the Chesapeake Bay TMDL
  - Monitoring results and industrial acreages used to calculate facility specific TN, TP & TSS loading rates
  - If higher than those included in TMDL, permittee must develop and implement a Chesapeake Bay TMDL Action Plan
  - If lower than those included in TMDL, no further action required

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Construction Stormwater Permitting

- General VPDES Permit for Discharges of Stormwater from Construction Activities (VAR10)
  - Preparation of a Stormwater Pollution Prevention Plan (SWPPP) prior to applying for permit coverage
  - SWPPP must include approved Stormwater Management (SWM) Plan
  - SWM Plan must address post-construction water quality & water quantity

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Construction Stormwater Permitting

- SWM Plan – Water Quality Modeling
  - Virginia Runoff Reduction Method (VRRM)
    "Simple Method" on steroids
  - New Development – 0.41 lb TP/ac/yr
    Center for Watershed Protection – Impervious Cover Model
  - Redevelopment – 10% or 20% reduction in existing TP loading
    % reduction dependent on total amount of land disturbance

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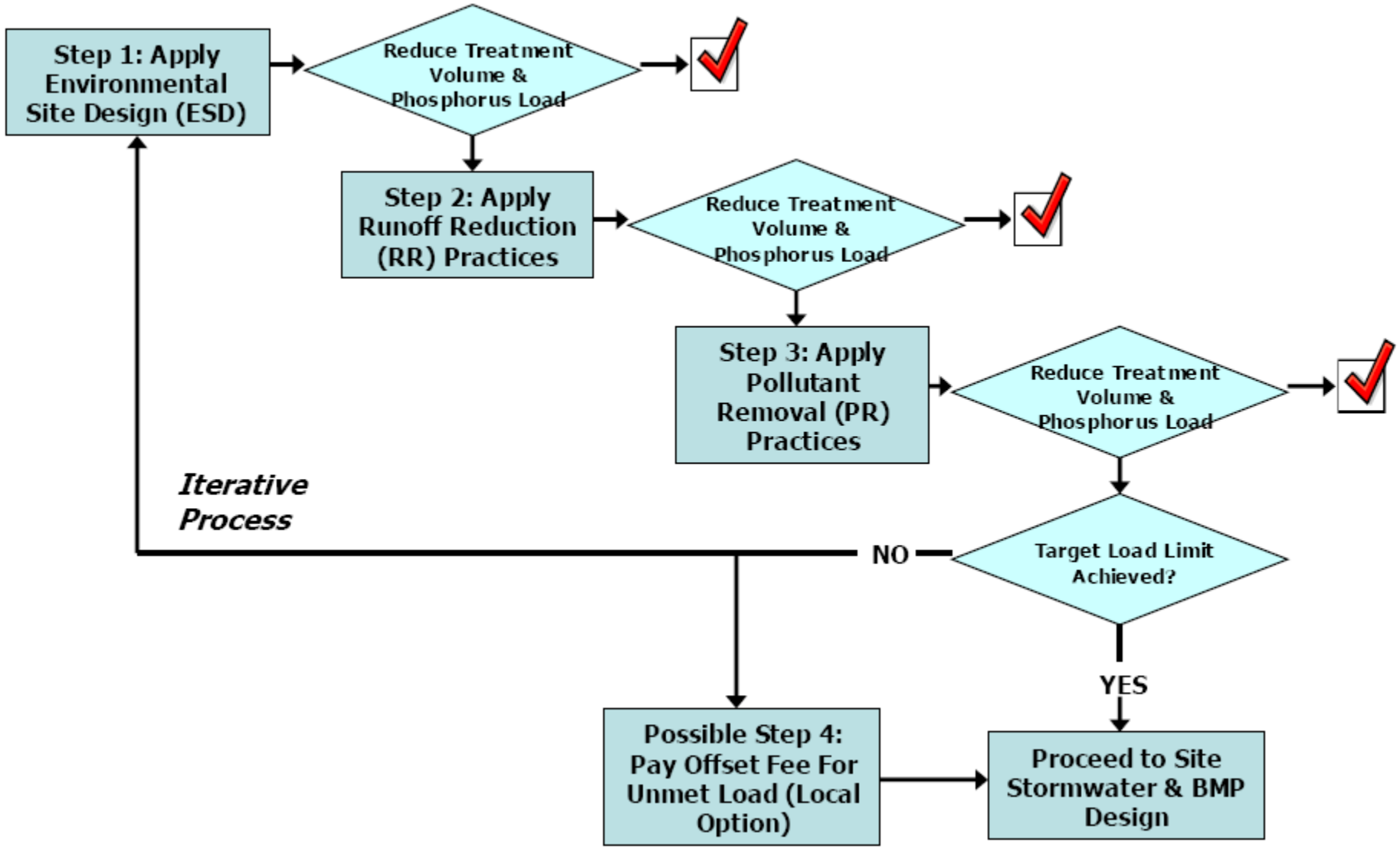
Step 1: Apply Environmental Site Design (ESD)
Reduce Treatment Volume & Phosphorus Load
Step 2: Apply Runoff Reduction (RR) Practices
Reduce Treatment Volume & Phosphorus Load
Step 3: Apply Pollutant Removal (PR) Practices
Reduce Treatment Volume & Phosphorus Load
Iterative Process
NO
Target Load Limit Achieved?
YES
Possible Step 4: Pay Offset Fee For Unmet Load (Local Option)
Proceed to Site Stormwater & BMP Design

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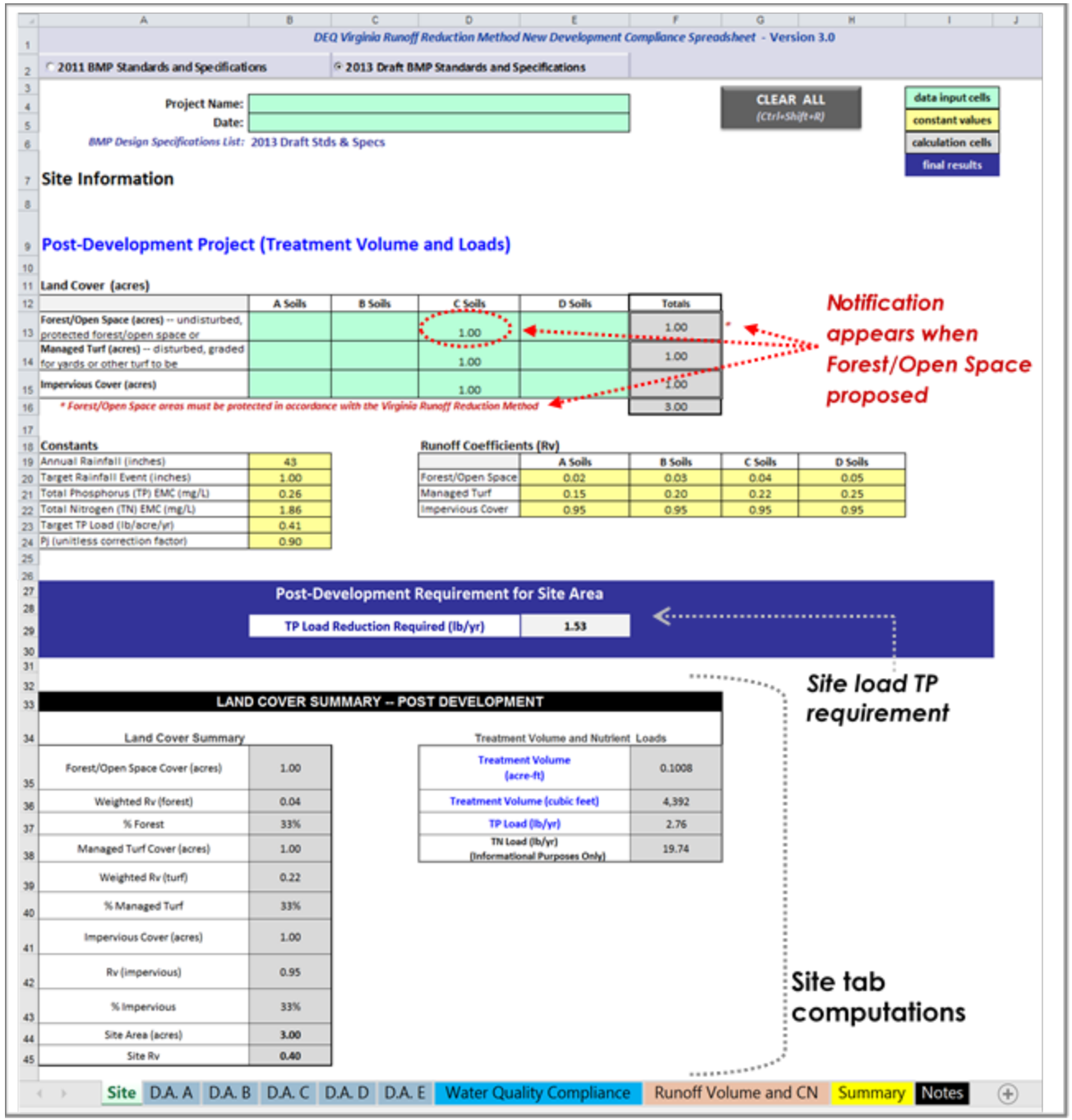
DEQ Virginia Runoff Reduction Method New Development Compliance Spreadsheet - Version 3.0
2011 BMP Standards and Specifications
2013 Draft BMP Standards and Specifications
Project Name:
Date:
BMP Design Specifications List: 2013 Draft Stds & Specs
CLEAR ALL (Ctrl+Shift+R)
data input cells
constant values
calculation cells
final results
Site Information
Post-Development Project (Treatment Volume and Loads)
Land Cover (acres)
A Soils
B Soils
C Soils
D Soils
Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or
1.00
1.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be
1.00
1.00
Impervious Cover (acres)
1.00
1.00
3.00
* Forest/Open Space areas must be protected in accordance with the Virginia Runoff Reduction Method
Notification appears when Forest/Open Space proposed
Constants
Annual Rainfall (inches) 43
Target Rainfall Event (inches) 1.00
Total Phosphorus (TP) EMC (mg/L) 0.26
Total Nitrogen (TN) EMC (mg/L) 1.86
Target TP Load (lb/acre/yr) 0.41
Pj (unitless correction factor) 0.90
Runoff Coefficients (Rv)
A Soils
B Soils
C Soils
D Soils
Forest/Open Space 0.02 0.03 0.04 0.05
Managed Turf 0.15 0.20 0.22 0.25
Impervious Cover 0.95 0.95 0.95 0.95
Post-Development Requirement for Site Area
TP Load Reduction Required (lb/yr) 1.53
Site load TP requirement
LAND COVER SUMMARY -- POST DEVELOPMENT
Land Cover Summary
Forest/Open Space Cover (acres) 1.00
Weighted Rv (forest) 0.04
% Forest 33%
Managed Turf Cover (acres) 1.00
Weighted Rv (turf) 0.22
% Managed Turf 33%
Impervious Cover (acres) 1.00
Rv (impervious) 0.95
% Impervious 33%
Site Area (acres) 3.00
Site Rv 0.40
Treatment Volume and Nutrient Loads
Treatment Volume (acre-ft) 0.1008
Treatment Volume (cubic feet) 4,392
TP Load (lb/yr) 2.76
TN Load (lb/yr) (Informational Purposes Only) 19.74
Site tab computations
Site
D.A. A
D.A. B
D.A. C
D.A. D
D.A. E
Water Quality Compliance
Runoff Volume and CN
Summary
Notes

Construction Stormwater Permitting

- SWM Plan – Water Quantity Modeling (1-, 2-, 10-year 24-hour storm)
  - Modeling software – TR-20, TR-55, HEC-HMS, HEC-RAS, EPA SWMM
  - Rainfall estimates – NOAA Atlas 14
  - Channel Protection (1-, 2-year 24-hour storm)
    "Energy Balance" for discharges to natural receiving channels
  - Flood Protection (10-year 24-hour storm)
    "Localized Flooding" or "No Localized Flooding"

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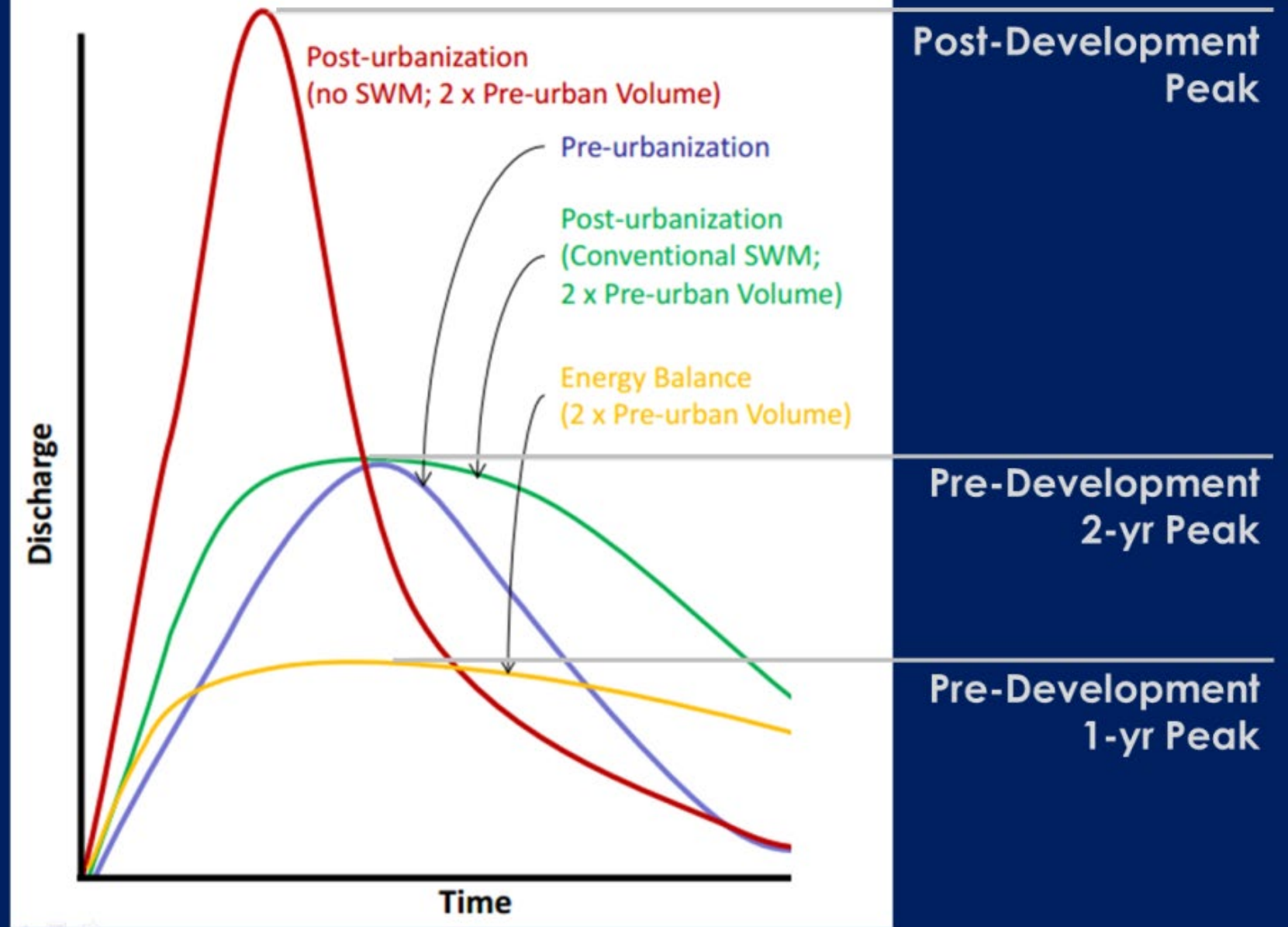
Energy Balance



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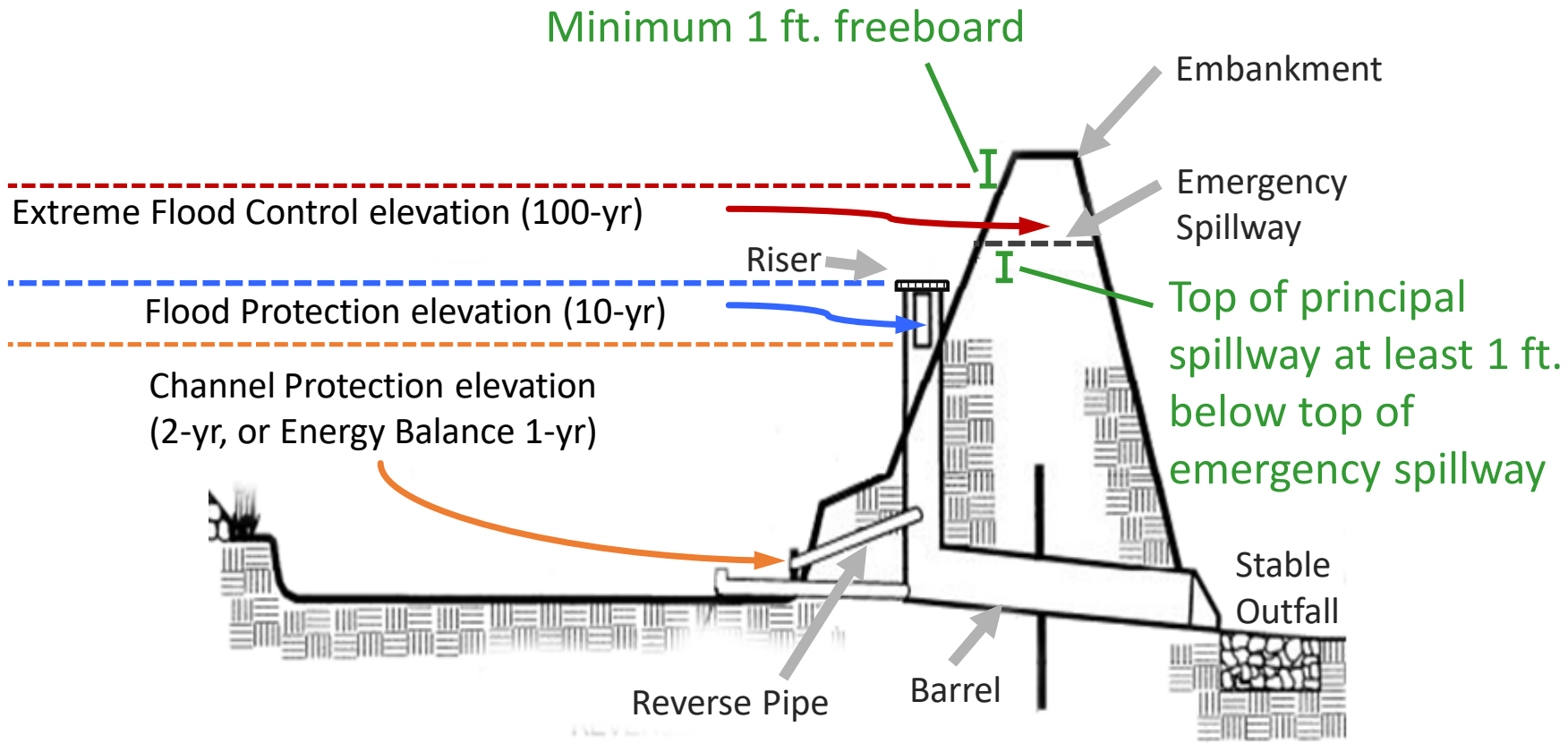
Stormwater Management Pond Schematic (Profile)



Water quantity compliance on approved plan/installed pond achieved via size of riser pipe, size of riser orifice(s), size of outflow pipes, and barrel size.
Pipe materials/specs should be verified in accordance with approved plan

Additional Resources

- DEQ Office of Training Services
  - https://www.deq.virginia.gov/ConnectWithDEQ/TrainingCertification.aspx
  - Environmental Learning Management Systems (ELMS)
  - SWM, ESC & RLD Training Modules

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Questions & Answers

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