

Quantity Subcommittee Update

January 21, 2011

Presented by:

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Current Status

- Subcommittee last met Thursday, January 13.
- Consensus was reached on all language revisions.
- The subcommittee presents one suggestion and one question (which transcend the Quantity Subcommittee) to the full RAP:
 1. The full revised regulations should be tested on actual development sites to determine any unforeseen impacts.
 2. Regarding redevelopment of a previously-redeveloped site: Should redevelopment requirements (i.e., 20% reduction) be met with each redevelopment project if such projects involve the same geographic area that already provided the required reduction?



Quantity Control

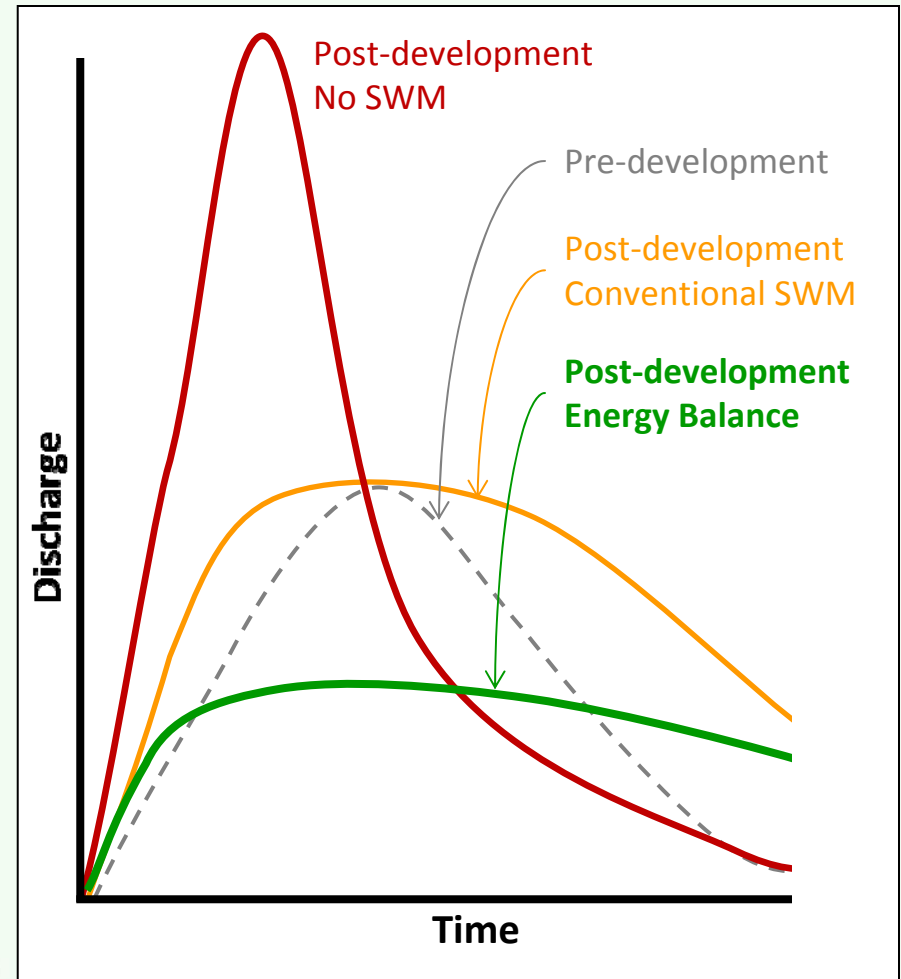
Energy Balance (or Power Balance)

1. Energy (Joule or Nm)

- The ability to do work
- Work = Force x Distance ($F_x \Delta x$)

2. Power (Watt or J/s)

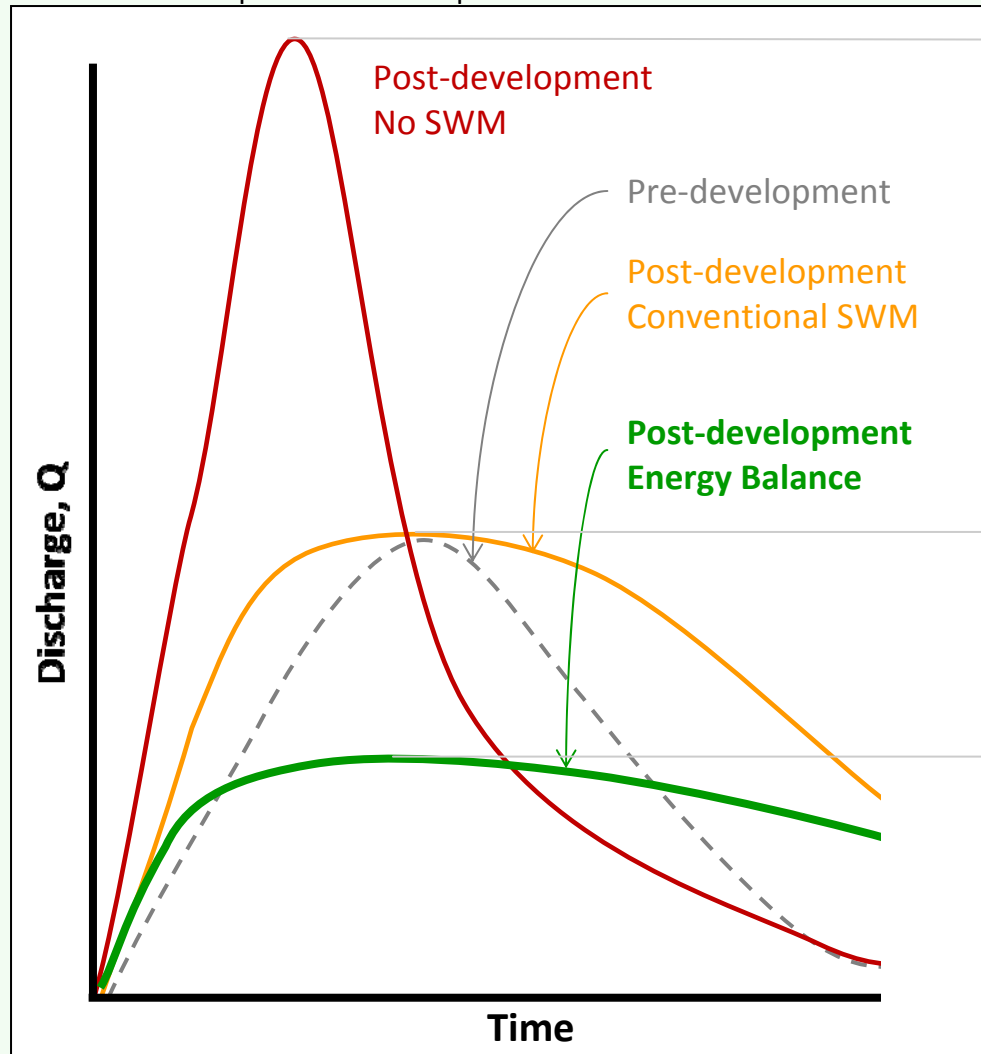
- The rate at which force does work
- Power = Work / Time
- The Energy Balance Method is really Power Balance because it relies on Q (discharge, cfs)



Energy Balance

The theory behind 4VAC50-60-66.B

Assume $RV_{\text{post}} = 2 \times RV_{\text{pre}}$ in all cases.



No SWM

$$Q_{\text{pre}} = 2 \times Q_{\text{post}}$$
$$Q_{\text{pre}} \times RV_{\text{pre}} = 4 \times Q_{\text{post}} \times RV_{\text{post}}$$

Conventional SWM

$$Q_{\text{pre}} = Q_{\text{post}}$$
$$Q_{\text{pre}} \times RV_{\text{pre}} = 2 \times Q_{\text{post}} \times RV_{\text{post}}$$

Energy Balance

$$Q_{\text{pre}} = 0.5 \times Q_{\text{post}}$$
$$Q_{\text{pre}} \times RV_{\text{pre}} = Q_{\text{post}} \times RV_{\text{post}}$$

Potential Effect

Of 4VAC50-60-66

- Adequate Outfall (MS-19) no longer required.
- Pond footprints will be similar ($\pm 20\%$) because the 10-year Flood Protection governs the overall size (which matches most current requirements).
- The 2-year orifice will be reduced to meet 1-year Energy Balance requirement.
- The 1-year detention volume will usually be greater than the current 2-year volume requirement.
- ***Again, the full revised regulations should be tested on actual development sites to determine any unforeseen impacts.***



Potential Effect

Of 4VAC50-60-66

HSG	Development Type	Overall ED Pond Size (proposed / existing regulations)	
		Pasture (I.F. = 0.8)	Forest (I.F. = 1.0)
B	Residential, 1-ac lots	100%	106%
	Residential, 0.25-ac lots	101%	104%
	Townhouse	107%	106%
	Commercial	111%	109%
	Paved	115%	111%
C	Residential, 1-ac lots	100%	103%
	Residential, 0.25-ac lots	100%	101%
	Townhouse	102%	102%
	Commercial	103%	103%
	Paved	104%	105%
D	Residential, 1-ac lots	107%	103%
	Residential, 0.25-ac lots	101%	101%
	Townhouse	101%	101%
	Commercial	101%	102%
	Paved	102%	102%



Proposed Language Revisions

See Word document