

**ATTACHMENT B**

**CONCEPT**

**for**

**RATE MITIGATION CREDIT**

## **ATTACHMENT B**

### **Concept for Rate Mitigation Credit**

Detention facilities in Sarasota County are now required to attenuate the flow from developed sites for the 100-year, 24-hour storm such that the pre-developed peak flow is not exceeded. Facilities constructed prior to promulgation of the new code fall short of the requirement. However, since they do provide attenuation for lesser storms, some credit should be available.

The credit assigned should not be based on relative rainfall depths or peak runoff rates, but rather the detention volume which would be required to attenuate the flow. The following analysis is ESU-based in order to establish a consistency with the rest of the County's stormwater utility program.

The analysis assumes a hypothetical 160-acre site in a natural (woods/grass) state underlain by Type "B" soils with Antecedent Moisture Condition I. Peak flows for the 10-year, 25-year and 100-year, 24-hour storms are then determined. These are the respective allowable discharges for the developed condition.

This hypothetical site is developed into approximately 743 ESUs. Retention volume for pollution abatement is determined to be 6.6 acre-feet. The following figure shows how retention volume is depicted on the site's post-development inflow hydrograph. This volume of 6.6 acre-feet is the same regardless of the design storm analyzed.

All of the area beneath the inflow hydrograph after the retention volume is filled represents the total outflow volume. A hypothetical outflow hydrograph is simply a straight line connecting the time at which outflow can begin to occur to the allowable discharge on the receding limb of the inflow hydrograph. The area below the inflow hydrograph and above the hypothetical outflow hydrograph excluding retention is the attenuation volume.

For the 100-year storm, the attenuation volume is determined to be 58.0 acre-feet. For the 10-year and 25-year storms, the volumes are 48.9 and 52.2 acre-feet, respectively. Therefore, the rate mitigation factor for attenuating the 10-year storm is:

$$\frac{48.9 \text{ acre - feet}}{58.0 \text{ acre - feet}} \times 100 = 84.35\%$$

The rate mitigation factor for attenuating the 25-year storm is:

$$\frac{52.2 \text{ acre - feet}}{58.0 \text{ acre - feet}} \times 100 = 90.0\%$$

**ATTACHMENT C**

**DEVELOPMENT / MITIGATION  
SCENARIOS**



## 2. Development

The percentages being used in this example can vary by watershed. The weighted percentages are:

Quality	=	40%
Rate	=	20%
Quantity	=	40%

The resulting formula is:

$$\begin{aligned} & (\text{Quality Weight})(\text{Percentage}) + (\text{Rate Weight})(\text{Percentage}) + (\text{Quantity Weight})(\text{Percentage}) \\ & (40\%)(P_{\text{quality}}) + (20\%)(P_{\text{rate}}) + (40\%)(P_{\text{quantity}}) = \text{Mitigation Credit} \end{aligned}$$

**Example 1:** The property owner has a pond that retains one inch of runoff and attenuates the 25-year storm.

$$(40\%)(80\%) + (20\%)(90\%) + (40\%)(43\%) = 67.2\%$$

**Example 2:** The property owner has a pond that retains one inch of runoff and attenuates the 100-year storm.

$$(40\%)(80\%) + (20\%)(100\%) + (40\%)(43\%) = 69.2\%$$

**Example 3:** The property owner has a pond that retains 1.5 inches of runoff and attenuates the 25-year storm event.

$$(40\%)(90\%) + (20\%)(90\%) + (40\%)(59\%) = 77.6\%$$

**Example 4:** The property owner has a wet detention pond which stores 1 inch of rainfall and attenuates the 100-year storm event.

$$(40\%)(80\%) + (20\%)(100\%) + (40\%)(0\%) = 52\%$$

**Example 5:** The property owner has a wet detention pond which stores 1 inch of rainfall and attenuates the 25-year storm event.

$$(40\%)(80\%) + (20\%)(90\%) + (40\%)(0\%) = 50\%$$

### 3. Development with Cisterns on Individual Parcels

The same percentages used for development are incorporated.

**Example 1:** The subdivision in which the house is located is not serviced by any stormwater treatment facility. The individual property owner installs a cistern.

$$(40\%)(0\%) + (20\%)(0\%) + (40\%)(28\%) = 11.2\%$$

**Example 2:** The subdivision has a pond that retains the first inch of runoff and attenuates the 25-year storm. The individual property owner installs a cistern.

$$(40\%)(80\%) + (20\%)(90\%) + (40\%)(28\% + 43\%) = 78.4\%$$