

Appendix E Credit Concept and Examples

The following outlines one potential credit system, taking into account the principles laid out in the Credits white paper. Note that all of the examples used in here for estimated load reductions and critical pollutants are fictional; they are merely intended to illustrate how the credit system would work.

Four Components

Under this credit system, the credit factor for a particular structural BMP is determined by four components: 1) the critical pollutants for the watershed or sub-watershed; 2) the load reduction of those critical pollutants; 3) the amount of impervious cover treated; and 4) the funding source used to install and maintain the BMP. If more than one BMP is present on a property, credit factors for each are added together to produce an overall credit factor.

- 1) The first component is what the **critical pollutants** are for the watershed or sub-watershed in which the BMP is located. If, for example, temperature is the only pollutant of primary concern in a particular sub-watershed, then the critical pollutant is expressed as temperature (100%, or 1). If low base flow and phosphorus are the two pollutants of most concern, with low base flow being of somewhat greater concern, then the critical pollutants for that sub-watershed might be low base flow (60%, or .6) and phosphorus (40%, or .4) (see example C below). Determination of critical pollutants is made by reference to watershed management plans, collected data, judgment of Engineering staff, and other sources as appropriate.
- 2) Once the critical pollutants are determined, the **load reduction** capability of the BMP for each critical pollutant is calculated. The degree to which a particular BMP would reduce a particular pollutant would be a set figure, determined by reference to sources such as the University of New Hampshire's Stormwater Center and the experience of the City.
- 3) The amount of **impervious cover treated** is expressed as a fraction of the total amount of impervious cover on the property. If the BMP treats more than the amount of IC on the property (i.e. treats runoff originating from land outside the property), this fraction can be greater than 1.
- 4) If all **funding** for a BMP is provided for by a property owner, including both construction and maintenance, the property owner would receive 100% of the normal credit for the BMP. If the BMP is paid for by an outside entity, such as ARRA or the utility, the owner would receive 20% (.2) of the normal credit; if the BMP is both paid for and maintained by an outside entity, the owner would receive 5% (.05) of the normal credit. For porous pavement or other BMPs with value beyond stormwater treatment, this determination is made based on the additional cost of the BMP over traditional methods (see Example B below).

Example A

Property A is a 1 acre lot with half an acre of impervious surface. This is equal to 7 ERUs, so, without any credit for BMPs, its quarterly fee would be \$78.75.

The owner of Property A is adding on to his building, and as a result must put in a new retention (wet) pond. He is funding the project himself. The BMP will treat 75% of the impervious cover on his land.

Property A is in a sub-watershed in the Arctic Brook watershed. The only critical pollutant for that particular sub-watershed is channel protection, and the retention pond has an estimated load reduction for high peak flows of 50%.

<u>BMP</u>	<u>Crit. Poll. %</u>	<u>Est. Load Reduction</u>	<u>% IC Treated</u>	<u>Funding</u>
Retention Pond	100%	50%	75%	100%

The formula: (crit. pollutant)(load reduction)(IC treated)(funding) = credit factor

So the credit factor is calculated as follows:

$$1 \times 0.5 \times 0.75 \times 1 = 0.375$$

This credit factor is multiplied by the quarterly fee to calculate the credit amount:

$$0.375 \times \$78.75 = \$29.53$$

With a credit of \$29.53 per quarter, the owner of Property A would pay \$49.22 a quarter instead of \$78.75.

Example B

Property B is a 5 acre lot with two acres of impervious surface. This is equal to 28 ERUs, so, without any credit for BMPs, its quarterly fee would be \$315.

The owner of Property B is redoing her parking lot, and decides to use porous pavement and a subsurface wetland in the process. She is paying for the cost of a traditional parking lot, and the utility is paying for the additional cost of using porous pavement instead and for the subsurface wetland. She will maintain both. The porous pavement will treat all the runoff from the parking lot, which constitutes 80% of the impervious cover on her land. The subsurface wetland will treat 75% of the parking lot, or 60% of the total impervious cover on her land.

Property B is in a sub-watershed in the Kenduskeag Stream watershed. The only critical pollutant for that sub-watershed is chlorides. Porous pavement has an estimated load reduction for chlorides of 40%, and subsurface wetlands have an estimated load reduction for chlorides of 0%.

<u>BMP</u>	<u>Crit. Poll. %</u>	<u>Est. Load Reduction</u>	<u>% IC Treated</u>	<u>Funding</u>
Porous Pavement	100%	40%	80%	20%
Subsurface wetland	100%	0%	60%	20%

The formula: (crit. pollutant)(load reduction)(IC treated)(funding) = credit factor

So the credit factor is calculated as follows:

$$1 \times 0.4 \times 0.8 \times 0.2 = 0.064$$

$$1 \times 0 \times 0.6 \times 0.2 = 0$$

These credit factors are added together to get an overall credit factor:

$$0.064 + 0 = 0.064$$

This credit factor is multiplied by the quarterly fee to calculate the credit amount:

$$0.064 \times 315 = \$20.16$$

With a credit of \$20.16 per quarter, the owner of Property B would pay \$294.84 a quarter instead of \$315.

Example C

Property C is a 15 acre lot with 10 acres of impervious surface. This is equal to 140 ERUs, so, without any credit for BMPs, it would have a quarterly fee of about \$1575.

Property C has a number of BMPs, including detention ponds put in as part of the original development, a pair of artificial wetlands put in when part of the property was redeveloped, and a large infiltration chamber and two tree box filters put in with funding from the utility. The infiltration chamber treats half of the impervious on Property C and 10 acres of other impervious, a combination of publicly owned highway and other private land. The owner will maintain all the BMPs except the infiltration chamber, which will be maintained by the utility.

Property C is in a sub-watershed of the Penjajawoc watershed. There are two critical pollutants for that sub-watershed, temperature (60%) and phosphorus (40%). The estimated load reductions for those critical pollutants for each BMP is as outlined below.

<u>BMP</u>	<u>Temperature</u>		<u>Phosphorus</u>		<u>% IC Treated</u>	<u>Funding</u>
	<u>Crit. P. %</u>	<u>Est. L. R.</u>	<u>Crit. P. %</u>	<u>Est. L. R.</u>		
Det. ponds	60%	0%	40%	0%	90%	100%
Art. wetlands	60%	20%	40%	40%	40%	100%
Inf. chamber	60%	60%	40%	10%	150%	5%
Tree boxes	60%	20%	40%	40%	10%	20%

The formula: $[(\text{load reduction})(\text{crit. poll. \%}) + (\text{load reduction})(\text{crit. poll. \%})](\text{IC treated})(\text{funding}) = \text{credit factor}$

So the credit factor for each BMP is calculated as follows:

Detention ponds: $(0.6 \times 0 + 0.4 \times 0) \times .9 \times 1 = 0$

Artificial wetlands: $(0.6 \times 0.2 + 0.4 \times 0.4) \times .4 \times 1 = .112$

Infiltration chamber: $(0.6 \times 0.6 + 0.4 \times 0.1) \times 1.5 \times 0.05 = 0.03$

Tree box filters: $(0.6 \times 0.2 + 0.4 \times 0.4) \times 0.1 \times 0.2 = 0.0056$

These credit factors are added together to get an overall credit factor:

$$0 + 0.112 + 0.03 + 0.0056 = 0.1476$$

This overall credit factor is multiplied by the quarterly fee to calculate the credit amount:

$$0.1476 \times 1575 = \$232.47$$

With a credit of \$232.47 per quarter, the owner of Property C would pay \$1342.53 a quarter instead of \$1575.