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# Green infrastructure: Street trees reduce stormwater impacts

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Trees add an obvious aesthetic appeal to any community or development ... and new thinking has turned street trees into another tool in the sustainability toolbox. Trees have long been used to "green" developments and streetscapes. They reduce CO2 levels, give off clean oxygen, and help reduce the "heat island" effect. Now, municipalities and developers are turning to trees in the fight to reduce and treat stormwater. The Problem Roadways and parking lots continuously collect contaminants such as oil, gas, antifreeze, and heavy metals. When it rains, this material is flushed from the surface of the asphalt, and usually directed toward a catch basin and into pipes that transport it to the nearest wetland, pond, river, stream or harbor, where it adversely impacts the local eco-system and degrades drinking water supplies. Reducing stormwater runoff is also becoming the focus of many regulatory agencies. The continued impacts from stormwater on the Charles River in Mass. caused the U.S. EPA to take action in 2008. Under provisions of the Clean Water Act, the EPA has required certain "commercial, industrial and high density facilities" within the Mass. towns of Milford, Franklin, and Bellingham to acquire a permit demonstrating that phosphorous contamination in stormwater discharges from each site has been reduced by 65%. The EPA's website states, "Ultimately, these requirements will likely apply to the entire Charles River watershed." In addition, many New England municipalities faced with impending federal restrictions on stormwater effluent are contemplating imposing Stormwater Utility Fees. These fees often include credits/reductions if a developer implements measures that specifically reduce stormwater runoff from a property. How Trees Help Over the last five years there has been increased interest in using trees to pre-treat stormwater prior to discharging it into traditional piped drainage systems. Tree box filters consist of a structure that contains the tree and specialized organic soil material; the structure is typically situated up-gradient of a stormwater catch basin where it collects water before it can reach the basin. The tree roots absorb some of the pollutants, while others are allowed to infiltrate naturally into the surrounding soils. Tree box filters have proven to be an excellent system for treatment and removal of common stormwater pollutants. The UNH Stormwater Center's 2012 Biennial Report lists the percentage removal rate of petroleum hydrocarbons, zinc, and total suspended sediments to be 99%, 75%, and 91% respectively. The UNH report found that their tree box filters' ability to treat water quality remained relatively consistent through all seasons over the course of the past eight years. There are many proprietary versions of tree box filters that can be installed "off the shelf." If site conditions warrant, a civil engineer can design a unique system. Nitsch Engineering, in concert with the city of Boston Public Works Department, is overseeing the installation of four tree box filters as a pilot project that is scheduled for completion in spring 2013. Boston has a goal to plant 100,000 new trees over the next decade, and each one is a potential individual filtration device that could reduce stormwater pollutants to the Charles River, Boston Harbor, and other water bodies, while reducing the city's exposure to EPA regulatory action.

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