

HMA Pavements & LEED Certification

By Richard O. Wolters, P.E., Executive Director, Minnesota Asphalt Pavement Association; and Jill M. Thomas, P.E., Associate Director, Minnesota Asphalt Pavement Association

Global economic competition, metropolitan congestion, and global climate change are among the new dynamics that require new thinking in the nation's transportation and development systems of the future.

Did you know that the production and placement of hot-mix asphalt (HMA) pavements consumes less fuel and produces lower levels of greenhouse gases? According to a recent study, HMA pavements require about 20 percent less energy to produce and construct than other pavements.¹ Less fuel consumption means less production of carbon dioxide and other greenhouse gases.



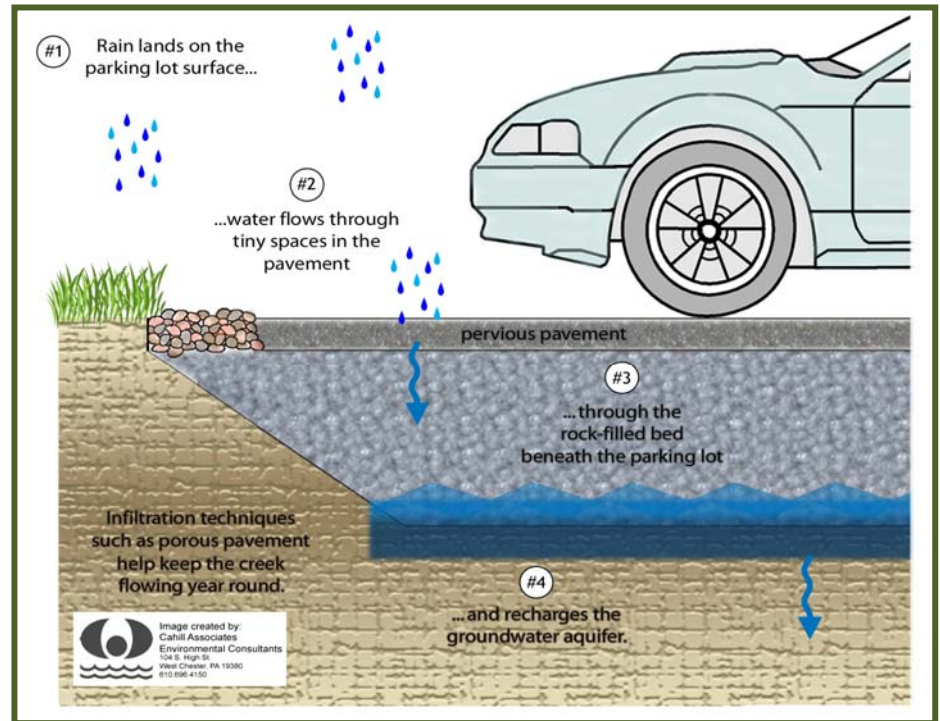
Also, since 1970, the asphalt industry has decreased total emissions from hot-mix plants by 97 percent while increasing production by 250 percent.² Emissions from asphalt plants are so low, the EPA considers them as only minor sources of industrial pollution.³

Currently there are considerations for the urban heat island (UHI) effect, and it is not a black and white issue. According to the United States Environmental Protection Agency, "there is no official standard or labeling program to designate cool paving materials and research in this area is in an early stage."⁴ While studies show that pavements can affect the urban heat island and resulting air quality, results are complicated by several factors including the impact of shadows from nearby structures; changes in pavement characteristics over time; and the absorption by buildings of solar radiation reflected from the pavement surface. An article published in *Public Works* emphasizes that factors other than pavement color play a large role in urban heat island mitigation and that many strategies for reducing the UHI effect are being explored.⁵

Sustainability can be defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.⁶ Sustainable development is a common issue these days, and HMA is a "sustainable" pavement. The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is one rating method used to evaluate a building or construction project's environmental performance.



There are several ways that using HMA fits into the LEED Green Building Rating System.TM Managing storm water with porous or dense-grade HMA is one method that has been used in Minnesota with great popularity over the past five years and allows for infiltration of storm water on-site. The concept of managing storm water with porous or dense-graded hot mix asphalt (HMA) pavements has been used successfully since the 1970's in the United States and Europe to provide a solution to storm water runoff as well as groundwater table recharge. HMA pavements have been used in various climate conditions with the benefits of providing runoff control, aquifer recharge, reduction of drainage structures needed to comply with storm water regulations, and increased skid resistance and safety. The most common locations for use include parking lots and low volume roads, and in high activity recreational areas like basketball and tennis courts or playground lots. A typical HMA pavement section consists of either a porous or a dense-graded HMA pavement over a porous, large stone aggregate base course that has sufficient void space designed for runoff detention, frost penetration, and structural capacity, see figure.



The ability to recycle asphalt pavement (RAP) and shingles and the fact that it is produced locally make asphalt eligible for a large number of Materials and Resources credits. Also, warm mix and high-RAP (>10%) mixes⁷ offer several advantages which may receive credit under Innovation and Design. When all these factors are considered, asphalt pavements can contribute more LEED credits than other pavement types. Visit MAPA's web site at www.asphaltisbest.com for more information.

References:

1. Gambatese, John A. and Sathyanarayanan Rajendran, "Sustainable Roadway Construction: Energy Consumption and Material Waste Generation of Roadways," American Society of Civil Engineers, Reston, VA. Proceedings of 2005 Construction Research Congress. (www.pubs.asce.org)
2. Report to NAPA Members 2001, National Asphalt Pavement Association, Lanham, MD. 2002.
3. Federal Register, February 12, 2002, pp. 6521 ff. (http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2002_register&docid=02-3348-filed.pdf, accessed August 15, 2007). Also, Federal Register, November 8, 2002, pp. 68124 ff. (<http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov/2002/pdf/02-28502.pdf>, accessed August 15, 2007).
4. USEPA Heat Island web site, Cool Pavements: <http://www.epa.gov/heatisland/mitigation/pavements.htm> accessed January 15, 2009.
5. Golden, Jay, and Kamil Kaloush, "A Hot Night in the Big City: How to Mitigate the Urban Heat Island," Public Works, December 2005. (<http://www.pwmag.com/industry-news.asp?sectionID=760&articleID=268116>, accessed January 15, 2009.)
6. Brundtland Report, "Our Common Future," Oxford: Oxford University Press, 1987.
7. "Asphalt Pavements and the LEED Green Building System," Publication PS-32 and "Asphalt for Sustainability – Setting the Record Straight," Publication PS-31, National Asphalt Pavement Association, www.hotmix.org

