

Nanas, Elizabeth and Tani Bellestri

2011 "Highways." In Oladele Ogunseitan ed., *Green Health: An A-Z Guide, Volume 9*, Paul Robbins ed., *The SAGE Reference Series on Green Society: Toward a Sustainable Future-Series*. SAGE Publications. Series Description: <http://www.sagepub.com/books/Book233878?seriesId=Series1216>

Green Highways

Global acceleration of vehicle use is also accelerating highway construction. Expansion and maintenance of highway transportation systems relies upon the manufacture of cement which, at every stage of the process, takes a toll on the environment. Generally, cement manufacture disrupts biodiversity across ecological spaces through the extraction of fuels and raw materials such as limestone, coal, and petroleum, which further contributes to greenhouse gas production. Beyond the damage caused by the manufacture of cement, its use as a material in highway construction also has severe implications for the environment. In contrast, emerging green highway concepts and innovations facilitate highway transportation system solutions that are ecologically sustainable.

Green highway thinking is evident at the Federal, State, and local levels, with highway agencies researching and implementing innovations designed to foster sustainability and reduce the negative impacts of cement manufacture and highway construction on natural environments. Some of these measures include recycling old pavements, using materials other than cement in highway construction, and protecting watersheds, which suffer serious degradation related to run-off from cement highways. Further, steps have been taken to involve community members and business leaders in highway planning, construction, and maintenance decisions.

The Federal Highway Administration (FHWA), in 2002, embraced environmental stewardship as a vital component of highway construction, and this decision opened the door to a series of initiatives focused on the ecological sustainability of highway construction and maintenance. The FHWA has implemented a number of programs and methods for creating green highways, including: the *Exemplary Ecosystem Initiative*, which recognizes best practices in environmental stewardship as demonstrated at the State level; *Planning and Environment Linkages*, which supports a variety of resources directed at promoting the relationship between planning and the National Environmental Policy Act; and *Recycling* initiatives, which have seen the FHWA encourage an industrial byproducts exchange to facilitate the recycling and reuse of materials.

Multidisciplinary partnerships, such as the Green Highways Partnership, have been forged in the effort to create sustainable highways. This initiative represents a voluntary, collaborative effort to create ecologically sustainable, functional transportation systems with minimum negative environmental impacts. Participating agencies include the FHWA, the U.S. Environmental Protection Agency Region 3 (which includes Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia), various State departments of transportation (DOTs), the National Asphalt Pavement Association, Villanova University, and an assortment of both public and private sector representatives. The comprehensive approach fostered by the Green Highways Partnership creates opportunities for uniting existing, complementary agencies and activities in the effort to green U.S. highways.

The best example of green highway logic in action is Maryland's Waldorf Transportation Improvement project, which is poised to become the nation's first truly green highway. Encompassing a section of US 301 that extends from Prince George's County to Charles County, the Waldorf project began applying green highway concepts in the earliest stages of planning.

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Some of the measures being implemented in relation to the project include evaluation of overall resource conditions and consultation with project partners and public stakeholders, all in effort to balance and minimize negative consequences on both the natural and built environments. Participants believe that the Waldorf project has the potential to serve as a model for other green highway projects across the United States.

Stormwater management is one of the major focuses of green highway construction. An example of the innovative stormwater management methods being embraced in green highway initiatives includes the use of biocells, like the one installed in Washington, DC, in 2004, by the District DOT. A biocell is composed of natural materials such as mulch, soil mix, and various types of vegetation. As opposed to drainage pits, a biocell actually performs like a filtration device and can remove up to 90 percent of the suspended solids from stormwater. Using permeable materials to construct highways and their support structures will help keep metals and toxins from leaching into rivers and streams.

Recycling and reuse of materials is another major component of green highway strategies. Successful examples of recycling and reuse include the Pennsylvania DOT's use of shredded tires as lightweight embankment fill in the construction of the Tarrtown Bridge, and the West Virginia DOT's use of recycled blast furnace slag for much of its asphalt surface pavements. The blast furnace slag offers a number of benefits, including providing safer driving conditions due to its nonpolishing properties—the roadway does not experience as much spray or misting during rain, providing better visibility and less hydroplaning.

Finally, in efforts to improve conservation and ecosystem management as they relate to highway construction, green highway projects incorporate the concepts of "green infrastructure". Rooted in the way that wetlands, forest preserves, and native plant vegetation naturally manage stormwater, not only is the approach practical, holistic, multifunctional, and science-based, but it usually costs less to install and maintain than do traditional forms of infrastructure. Successes in innovative conservation and ecosystem efforts include Delaware's Blue Ball Properties project. A result of the partnership between the Delaware DOT and the local community, the Blue Ball project used an environmental stewardship approach in its plans to accompany highway repair and construction with the seeding of several large areas as meadows; the restoration of a stream; the creation of a wetland; and the development of a regional stormwater management system that includes ecologically sound features.

These efforts to green U.S. highways represent a willingness to embrace new strategies in creating highway systems that are efficient and sustainable. By relying on integrated planning, market-based approaches, regulatory flexibility, and environmental streamlining, green highway initiatives represent the next logical step in the evolution of efforts to marry socio-cultural needs to ecological sustainability.

See Also: Government Role in Green Health; Groundwater; Highways; Private Industry Role in Green Health; U.S. Environmental Protection Agency

Bibliography

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