

UNI-GROUP U.S.A.

UNI Eco-Stone[®] Permeable Interlocking Concrete Pavement

Low Impact Development, LEED[®] and Environmental Design

In addition to the EPA and municipalities, other agencies and organizations are addressing the issue of development and the impact of stormwater runoff on the environment and society. According to the National Resources Defense Council, **Low Impact Development** (LID) has emerged as an attractive approach to controlling stormwater pollution and protecting watersheds. LID attempts to replicate pre-development hydrology to reduce the impacts of development. By addressing runoff close to the source, LID can enhance the environment and protect the public while saving developers and local municipalities money. One of the primary goals of LID design is to reduce runoff volume by infiltrating rainwater into the ground and finding beneficial uses for water instead of pouring it down storm sewers. Some of LID runoff control objectives include reducing impervious cover, preserving and recreating natural landscape features, and facilitating infiltration opportunities. LID principles are based on the premise that stormwater management should not be simply stormwater disposal, but instead that numerous opportunities exist within a developed landscape to control stormwater close to the source. This allows development to occur with low environmental impact. Permeable pavers, such as Eco-Stone[®], are listed suggested as one of the ten common LID practices.

A nationwide report by American Rivers highlighted the impact of sprawl and development on the environment and society. It maintains that huge volumes of water cannot be returned to the earth to recharge groundwater and aquifers, compounding drought situations in many areas of the U.S. In addition, they maintain that the stormwater runoff from these areas is threatening rivers and eco systems across the country. It encourages sustainable and low impact design and development to minimize impact on the environment. Several areas in the United States, such as the Southeast, Northeast and Southwest, are undergoing the worst drought conditions in recorded history. The drought is so severe in some cases, that potable water supplies for many cities are being impacted. Infiltration technologies advocated by LID and green building, such as permeable interlocking concrete pavements, offer a way to help filter precious rainwater back into the earth and recharge groundwater.



Increasing numbers of municipal green building programs are offering incentives for sustainable landscape architecture and development. Many cities have adopted **LEED[®]** (Leadership in Energy and Environmental Design, a national green building assessment system developed by the U.S. Green Building Council) standards for public buildings and a number of states, including Washington and Michigan have committed at the state level. The LEED[®] green building assessment system has become increasingly popular with the North American design community since its inception in 1998. This voluntary building system for rating new and existing commercial, retail, institutional, educational, and high-rise residential buildings evaluates environmental performance from a “whole building” perspective over the project’s life cycle. New LEED[®] design standards are being implemented for neighborhood development and residential homes as well. The minimum number of points or credits for a project to be LEED[®] certified is 26, though silver (33-38 points), gold (39-51 points), and platinum (52-69 points) ratings also are available.

The family of UNI Eco-Stone[®] permeable pavements may qualify for up to 14 points under the Sustainable Sites (SS), Material and Resources (MR), and Innovation and Design Process (ID) credits. While traditional concrete pavers also may qualify under some of the credits, PICP can earn LEED[®] points via Sustainable Sites stormwater management credits by meeting water quality and runoff treatment criteria. Some of the most easily attainable credits include:

- ▶ **Credit 5** (1 to 2 points) - Local Regional Materials - Specifies that a minimum of 20% of building materials are manufactured regionally within a 500 mile radius. An additional point can be earned if 50% of the regionally manufactured materials are extracted, harvested, or recovered within this radius. Most pavers meet these criteria.
- ▶ **Credit 6** - Stormwater Management - The intent of Credit 6 is to limit the disruption of natural water flows by minimizing stormwater runoff, increasing on-site infiltration, and reducing contaminants and pervious pavements are recommended. Credit 6.1 provides 1 point for building sites where the existing impervious area is greater than 50%. The LEED requirement is that runoff rate and quantity be reduced by at least 25%. Eco-Stone permeable pavements can reduce runoff to zero under many design storms. Credit 6.2 provides 1 point for treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP). Permeable pavements have been shown to reduce these pollutants in even greater percentages, with reductions as high as 95% of TSS and 70% of TP.
- ▶ **Credit 7** - Landscape and Exterior Design to Reduce Heat Islands - Credit 7.1’s (1 point) intent is to reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat - light-colored, high-albedo materials (a reflectance of at least 0.3 for 30% of the sites non-roof impervious surfaces) and open grid paving are recommended. Since concrete pavers can be manufactured in a wide range of colors, they can be made to register an albedo of at least 0.3. Higher values can be achieved by using white cement or light-colored aggregates (where available).

For additional LEED® credits and information, please see our web site or ask your UNI® manufacturer for a copy of the Interlocking Concrete Pavement Institute's *Tech Spec 16 - Achieving LEED® Credits with Segmental Concrete Pavements*.

The **National Association of Home Builders (NAHB)** and the **NAHB Research Center** publication, *Building Greener, Building Better, The Quiet Revolution* notes that Green Building is one of the most significant developments in the home building industry. Green Building encourages building homes that conserve resources and using land planning, site development, and design techniques to achieve that goal. Water conservation both indoors and out, energy efficiency and selection of materials based on recyclability, durability and amount of energy used to create the materials is encouraged. Eco-Stone® not only is an attractive material for residential driveways, walkways, and patios, it also conserves water by infiltrating stormwater back into the ground to recharge groundwater stores. The publication discusses Smart Growth, Green Building trends in land development and site design, Green Building and the connection to water resources and water quality, the NAHB and the U.S. Department of Energy voluntary energy efficiency program initiative, state home builder association environmental collaborations, and the PATH initiative (the Partnership for Advancing Technology in Housing program). Eco-Stone® permeable pavement offers an attractive solution to meeting impervious cover restrictions and is a green technology that offers added beauty, durability, and value to residential projects.

The **American Society of Civil Engineers (ASCE)** supports and encourages coordinated programs on the regional, state and local level to manage quantity and quality of stormwater entering waterways. They support stormwater management techniques that prevent and mitigate the results of increased urbanization and other land use changes on surface runoff. Failure to manage stormwater runoff increases downstream erosion, water quality degradation, and loss of aquatic habitat. These problems can be overcome with the development and implementation of practical stormwater management methods and technology consistent with the principles of sustainable development. Civil engineers are usually the lead professionals involved in the design, construction, operation, and maintenance of stormwater systems and recommend best management practices be utilized for the control of stormwater to enhance the built and natural environments. The ASCE notes these include reasonable recharge of storm runoff into the groundwater where soils permit, storage of excess stormwater to minimize downstream impacts, and use of grass filter strips and other natural filter areas to minimize pollution. Eco-Stone® allows for recharge of groundwater, mitigates pollution impact on surface waters, and can be integrated with vegetated areas for additional stormwater control.

The **American Society of Landscape Architects (ASLA)** and **American Institute of Architecture (AIA)** have both established green design programs as well, encouraging their membership to incorporate green design principles into their new projects. In a recent report, the AIA noted that the use of green building technologies and design had increased over 400% since 2003.

While many believe better site design, green building, low impact development and sustainable design are more expensive, a number of studies have shown that they actually save money over the long run, and in some cases, in upfront costs. These principals often can result in increased economic benefits, helping developers and local governments through reduced infrastructure requirements, decreased clearing and grading of sites, less costs for meeting stormwater management requirements and substantial energy savings.

For more information on Low Impact Development, LEED®, and Green Building, please visit our links page on our web site – www.uni-groupusa.org.

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