ACES
Acton Citizens for Environmental Safety
39 Pope Road
Acton, MA 01720

The Discovery Museums
177 Main Street
Acton, MA 01720

THE DISCOVERY MUSEUMS
(a non-profit organization)

Low Impact Development Components Retrofit Demonstration Exhibit for The Science Discovery Museum 177 Main Street Acton, MA 01720

Intel/OAR Aquifer Recharge Grant Program
February 2003

Background

In the Fall of 2002, Acton Citizens for Environmental Safety (ACES) submitted a Letter of Interest to the Intel Fund to Support Groundwater Recharge Projects in the Assabet River Watershed. ACES stated therein our philosophy that "small, incremental measures to protect groundwater, taken together over time, can have a large effect." We proposed therefore a series of demonstration projects to illustrate the benefits that residential Low Impact Development (LID) retrofits could have on the Assabet River Watershed. On December 3, 2002, ACES received from Anne Hurd of Intel an invitation to go forward with a full proposal along the lines of our Letter of Interest, with a strong recommendation that the demonstration installations be at a property belonging to the Town of Acton or a non-profit organization.

ACES approached The Discovery Museums (TDM) in January of 2003 regarding using the Museum property as a site for a demonstration/exhibit project. For the past several weeks, ACES representatives and TDM staff have been exchanging ideas and information to generate this proposal. A preliminary site evaluation was conducted by Steve Roy of GeoSyntec Consultants on February 24, 2003 which confirmed the appropriateness of this site for the implementation of LID technologies.

ACES is pleased to be able to partner with TDM in the development of this LID demonstration project for Acton and vicinity. We believe that the outdoor demonstration installation, coupled with TDM's related programming, will enhance the knowledge, understanding, and appreciation for the environment and local water management issues of all who visit the Museum and take advantage of its interactive experience. ACES would like to support TDM in the development of inquiry-based hands-on related programming to reinforce the key concepts related to LID technology. This project will increase public awareness of water management issues through the combination of the demonstration of technology and environmental education programming geared to the local community.

Overview of Proposed Project

About Acton and Stormwater. In preparation for meeting the Town's wastewater needs in the coming years, the Acton Wastewater Advisory Committee is developing a twenty year Comprehensive Water Resource Management Plan, which will tie together many smaller watershed projects. Stormwater management figures prominently in the plan by (1) protecting the rivers and waterways from non-point-source pollutants and excess nutrients and (2) compensating for the loss of recharge due to runoff and the flow of wastewater through existing and future treatment facilities It has been estimated that recharging a fraction of the storm water runoff would more than compensate for the flow of water through the treatment facilities.

The Town is also working on a storm water program funded through an Environmental Protection Agency (EPA) 319 grant to address nutrient loading of the Assabet river by employing Best Management Practices (BMP) structures at various sites. The Discovery Museum retrofit project will complement the Municipal EPA 319 project by creating possibilities for further recharge sites on town and private properties. Acton's involvement in the EPA Stormwater Phase II program includes a comprehensive storm water management plan and obtaining a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES Permit requires an educational component to develop community awareness of runoff, drains, and protection of the watershed. The demonstration site directly meets this need, and also promotes the techniques and benefits for minimizing runoff from private property.

About the TDM Site. The Discovery Museums are located at 177 Main Street in South Acton, Massachusetts, across the street and upgradient from Fort Pond Brook, a tributary of the Assabet River. The site abuts Acton's Great Hill Conservation Land. According to the Woodward & Curran Draft Comprehensive Water Resources Management Plan dated September 2002, the museum soils consist of till and bedrock (classified as Type C) with a low transmissivity rate (W&C draft, figure 2-8). Rock outcroppings and steep slopes also characterize the TDM lot, leading to runoff and drainage problems. Parking lots and pathways and the large Science Discovery Museum building footprint exacerbate runoff issues. Standing water collects in small depressions in the topography and there are several wet spots on the surface in damp weather. While wastewater is currently processed by two on-site disposal systems, TDM is in the Fort Pond Brook sewer district and has the potential to hook into the sewer system. French drains have been installed across the lot on either side of the Science Museum building to direct groundwater away from the leaching area.

About the Project Process.

LID Demonstration

ACES will contract with GeoSyntec Consultants to conduct a detailed site assessment of the TDM campus and identify appropriate areas for installation of LID retrofits as described below. This assessment will take into consideration the soils, drainage issues, and topography briefly noted above. A preliminary visit has already been performed by GeoSyntec in order to prepare this proposal. TDM staff will evaluate the GeoSyntec Consultants assessment using the criteria of feasibilty and consistency with the Museum's mission of providing meaningful learning opportunities to visitors. Plans suitable for use in construction will be generated by GeoSyntec Consultants where appropriate. Final decisions on siting and choice of retrofits rests with Museum staff.

TDM Programming

> "In the end, we will conserve only what we love,
> we will love only what we understand,
> and we will understand only what we are taught"
> --Baba Dioum, Senegalese conservationist

TDM is uniquely suited to serve as a demonstration site for LID technology and the development of water management related programming to reinforce LID concepts. TMD's approach to program development will be derived from two closely aligned models of learning, both known to enhance the learning process by engaging and enthusing children and adults. The pedagogy involved is known as "environment as integrating context" (EIC) and "inquiry-based" approaches. The EIC model is based on the concept of connecting learning to local natural and socio-economic environments and also emphasizes hands-on learning experiences. Inquiry-based learning directly involves students in the process of scientific inquiry through experimental design, testing, and interpretation of results. Combined, these models provide a powerful approach to develop knowledge and understand and appreciate the environment, community and natural surroundings.

Programs developed will emphasize water management and environmental awareness with inclusion of math and science concepts. Programs will be designed to be hands-on and interactive, incorporating direct experience of the natural environment through outdoor excursions as well as interactive classroom activities.

Resources/Curricula

The development of programs will result in the creation of resources and activities related to key water management concepts. TDM and ACES will work in partnership to foster relationships with other environmental and educational groups to uncover existing curriculum materials for the programs. To minimize duplication of effort, we will adapt and use available materials to the estent possible. At a minimum, we will draw upon the following sources:

- Low Impact Development Foundation
- Organization for the Assabet River
- United States Geological Survey
- United States Environmental Protection Agency
- Massachusetts Department of Environmental Protection
- Acton Municipal Resources (Health, Planning, Conservation, Acton Water District)