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Water Management: Looking Deeper/ Alternative Materials and Designs
(Extension of Paper #1)

Keeping in line with the ideals and goals expressed in *Cradle to Cradle*, William McDonough + Partners has committed to designing the new School of International Service building at American University as a building that “wages peace, promotes justice, builds community, strengthens health, celebrates nature and inspires humanity.”¹ The guiding principle of this project and of McDonough’s *Cradle to Cradle*, is that of “waste equals food.” The general concept of “waste equals food” is that all products can have initial designs that allow them, as a waste product, to either be safely deposited into the environment (the water or soil, etc...) or to be purely reused in the industrial cycle. This commitment to “eco-effectiveness” (making products “good” rather than “less bad”) made William McDonough + Partners the ideal design team for the new SIS building, working to achieve the SIS goal of showing how “concerns for social justice, sustainable development and peace can be part of a contemporary architectural design.”² One of the biggest challenges in a project that stresses environmental performance is knowing when to compromise the aesthetic qualities of the design for the environmentally effective qualities.

One area of design where questions of priority of form, function and cost arise is in water management. Throughout the world water is a resource whose importance is unparalleled – its scarcity and exploitation in some areas of the world has proven to be an obstacle for development strategies as well as maintaining the population’s health. Aside from the obvious need to optimize water use in the new design, it is also important to emphasize the symbolic and fundamental role that water plays in the lives of humans. Aside from the intended goals of water conservation through effective water management are the fortuitous savings and benefits in other areas of design such as: energy, worker productivity, general environmental benefits, and public relations value, among others.³ There are several basic means through which required storm water treatment and quantity in the District of Columbia can be achieved, including: the use of a cistern, storm filters, and rain gardens. Although the rain garden system is the dominant of the methods, William McDonough + Partners have proposed a plan using a combination of the three methods. The primary function of the cistern is to act as a temporary retention area for storm runoff that is then used for irrigation, solving both problems of storm water quantity control and quality treatment.⁴ At first glance the cistern system appears to be an appropriate system to use independently. It does, however, have its disadvantages in that it has intrinsic maintenance and operation costs that can be easily overlooked when looking at its function. The implementation of Storm Filters in conjunction with the

¹ Basis of Design Report, Pg. 3.

² Pg. 95.

³ <http://www.rmi.org>

⁴ Pg. 28.

cisterns would reduce those costs because it is a passive system that uses renewable resources such as leaves in its filtering system.⁵ Both of these systems are functional and relatively efficient, however, they are lacking any aesthetic function – an expressed desire in the SIS community. Rain gardens, while also functional, provide a more aesthetically pleasing alternative to the other systems. The drawbacks of the rain gardens are that in order to be effective rather than just efficient, they must occupy a large footprint on the campus, and the proper vegetation must be chosen. It is through the utilization of the two previously mentioned water management systems that the rain gardens become an effective tool, in theory.

There seemed to be several shortcomings of the entire water management system in terms of being “eco-effective.” The effectiveness of these methods all relies on one simple assumption – there will be a sufficient amount of rain year-round. The Basis of Design Report, concerned with addressing the ways in which the design is able to attain LEED credits, claims that “the use of captured rainwater from the cistern is intended to eliminate any reliance on city potable water resources for irrigation...”⁶ Without alternative irrigation and watering systems the life of the vegetation is in jeopardy – without rainwater the cistern is essentially worthless. In summer months this reliance on rainwater seems highly precarious and illogical. When taking this problem into consideration, it becomes essential to acknowledge that unless a system is implemented where there is a guarantee that any amount of rainwater will be sufficient to sustain the vegetation, then an irrigation system must be installed.

Rather than installing a conventional sprinkler system like the existing system on AU’s campus, more effective alternatives include: micro-spray systems, bubblers, soaker hoses, surface and subsurface drip irrigation.⁷ If these inherently more effective systems are ruled as too expensive and sprinklers are installed, there certainly are measures that can be taken to make the use of this system more efficient. As a student that has been at American University for four years, I have often been extremely irritated and frustrated with the absurdity of the operation of the current sprinkler system on campus. Competing with the “Energizer Bunny,” the sprinklers “keep going and going” – through rain and shine these sprinklers spray everything from the grass and plants to the sidewalks and students. The aim and scheduling of the irrigation system would drastically reduce the amount of excess water used when there is not enough rain for the rainwater harvesting system to be used unaccompanied by sprinklers. By being aware of the water requirements of a type of plant or soil, also known as *evapotranspiration* (ET), timers can be installed to customize the amount of water given to clusters of plants.⁸ Aside from this basic adjustment in scheduling there are several more expensive and high-tech devices that would greatly enhance the productivity of a sprinkler system. *Rain sensors* are hooked up to the irrigation control system and automatically turn off the system when it rains. Similarly, the *soil moisture sensor* measures the moisture of the soil and turns off the system when additional water is unnecessary.⁹

⁵ Pg. 28.

⁶ Pg. 99.

⁷ <http://www.rmi.org>

⁸ <http://www.rmi.org>

⁹ <http://www.rmi.org>

To make matters worse, not only does the vegetation rely on this captured rainwater, but so does the water sculpture located in the Rotunda entry. The water sculpture, central to the effort to express the connection between humans and water through an artistic and aesthetically pleasing display, detracts from the effectiveness of the project in that it requires (under DC code) that the water be re-filtered.¹⁰ This is where the question of priority comes into play – does beauty hold precedence over eco-effectiveness or even cost? Do the rain gardens and water sculpture act as mechanisms to invoke student activism, creativity, and cultural awareness? Is it part of design intention to build a “state-of-the-art, environmentally-friendly University building that supports sustainable development, social justice, poverty eradication and peace in the nation’s capital”?¹¹ While skeptical of the indispensability of these features, I also realize that often just a small touch of nature in a hectic or stressful day can make a big difference in one’s mood. While perhaps not as easy to implement as a water sculpture, a more eco-effective *and* aesthetically pleasing alternative is a *Marsh Machine*. The Cusano Environmental Education Center (CEEC) on the John Heinz National Wildlife Refuge in Philadelphia, Pennsylvania utilizes a Marsh Machine as a pedagogical tool as well as an effective water management tool. The system – essentially a mini indoor marsh – treats the wastewater from the building then recirculates the water for flushing toilets.¹²

An aspect of water management that went unaddressed in the first paper that I wrote for the project is the management and selection of bathroom fixtures. Rather than review the advantages and disadvantages of the different types of flush toilets, it is more important to discuss the effectiveness of waterless toilets and urinals. Despite common complaints that waterless toilets and urinals are far from odorless; if maintained properly, these systems do not smell any worse than tradition systems. The Chesapeake Bay Foundation’s Philip Merrill Environmental Center –the first building to receive the Platinum LEED rating-uses waterless composting toilets to minimize water use and maximize eco-effectiveness.¹³ These toilets have dual functions –to conserve water and to convert the human waste that goes into the toilet into fertile garden soil over the course of three years. An electronic faucet system – the system proposed in the Basis of Design Report –is the most effective system for the number of people that will be using the SIS restrooms.

Aware of the complex and difficult nature of implementing an “eco-effective” architectural and landscape design – especially on a site with limited space and numerous city codes and regulations – I have proposed several options that may or may not prove to fall under all of these regulations as well under cost regulations set by AU. I can, however, emphasize that the costs and benefits of the aesthetically pleasing portions of the design must be weighed carefully before dismissing less beautiful options that may perhaps be more effective environmentally. Perhaps the idealistic desire to make the SIS building a place that “will inspire students to dream” is an encumbrance to practicality and functionality of the building. Despite the inherent question of form versus function versus cost, the project will undoubtedly positively impact the ambiance and confidence

¹⁰ Pg. 99.

¹¹ Pg. 95.

¹² <http://www.maxmanpartners.com/ceec.html>

¹³ <http://www.cbf.org>

within the SIS community in particular and the entire AU community and its neighbors in general.

Works Cited

- “Cusano Environmental Education Center”. 2006. Susan Maxman and Partners. (19 February 2006) < <http://www.maxmanpartners.com/>>.
- “Philip Merrill Environmental Center”. 2006. Chesapeake Bay Foundation. (18 February 2006) < <http://www.cbf.org>>.
- “Water”. 2006. Rocky Mountain Institute. (18 February 2006) < <http://www.rmi.org>>.
- William McDonough and Partners, Quinn Evans Architects. 2005. *Basis of Design Report*.