



The Green Demonstration Project at the Milwaukee Public Museum

PROJECT NARRATIVE

1. History and Description of the Organization

The Milwaukee Public Museum (MPM) is one of the oldest natural history museums in the U.S. Established in 1882 as the Public Museum of the City of Milwaukee, the Museum's original collection predates this incorporation by nearly 30 years. Milwaukee County acquired MPM from the City of Milwaukee in 1976. In 1992, a public-private partnership was formed, creating a not-for-profit museum corporation, MPM, Inc., with a board of directors providing management of the facility. Under the current agreement, Milwaukee County owns the facility and collections, while the Museum is operated by MPM, Inc. MPM has grown considerably and currently houses 4 million specimens and objects. It receives national and global recognition for the excellence of its collections, research, and programs. Today, a half million children, families, educators, and scientists turn to MPM on an annual basis for exhibits and programs that advance knowledge, foster collaboration, and enhance the quality of life in our community and beyond. With these numbers, MPM is per capita the 6th most-utilized natural history museum in the United States.

MPM's education programs serve students in pre-kindergarten through graduate school and include early learning programs; distance learning (streamed across WI and the US); a program that helps at-risk students from falling behind in math/science; and free field trips for area schools each fall. Each year, more than 20,000 at-risk students from low-income areas receive needed educational programming from MPM. MPM's *SPARK!* program serves 1,000+ individuals with memory loss and their caregivers each year, helping them re-connect within the setting of MPM's exhibits. MPM's *Overnights* offer family-oriented, fun-filled exploration and have been named one of ten best museum sleepovers by *USA Today*. In the MPM *BioBlitz*, scientists race to count as many species as possible in 24 hours in a WI park, helping the public understand the importance of biodiversity and sharing needed information about at-risk/invasive species. MPM's *Summer Camps* help area youth understand scientific principles while doing research during field trips with MPM educators. MPM's collections preserve

information pertaining to anthropology, history, botany, zoology, and geology, forming the backbone for MPM's programs, exhibits, and research. MPM's exhibits receive local and national attention and have been leaders in depicting ethnic groups, preserving diverse cultures, reflecting new scientific findings, and incorporating technology. Research is taking place at MPM in the fields of geology, botany, history, biology, and anthropology and is disseminated via publications, presentations, and collaborations. Research topics include the migration of Wisconsin's plants in response to climate change, endangered moths in Door County, and arm placement in mummies. Research recently carried out via MPM's newly established Center for Wisconsin Biodiversity and Environment focused on mussel community composition and mussel growth patterns and allometric changes in Wisconsin; the diversity of Wisconsin's riverine dragonflies; and characteristics of the Orangespotted Sunfish.

2. Project Overview

a. Context

The quality of water in Lake Michigan is being jeopardized by an influx of contaminants. When stormwater fills the sewers during rain events and is combined with regular household and business use of water, an overwhelming amount of water is placed into the tunnel system. When this happens, the water volume exceeds the tunnels' capacity and water is then discharged directly into Lake Michigan without proper treatment. Introducing untreated water -- which includes raw sewage and toxic contaminants such as chemicals, pesticides, and heavy metals -- poses serious health and environmental threats. High levels of e.coli bacteria in water compromise the safety of drinking water and reduce recreational use of Lake Michigan, which negatively impacts the local recreational economy. The introduction of toxic contaminants such as chemicals, pesticides, and heavy metals results in a higher turbidity in the lake, which reduces the sunlight availability to necessary aquatic plants in the ecosystem. Decreased oxygen content in the water, which is a necessary component for fish and aquatic life, negatively affects the local fishing economy.

MPM's proposed Green Demonstration Project will aid in the fight to keep Lake Michigan's water clean and usable for drinking, recreational, and supporting wildlife purposes. This project will help keep water out of the tunnel systems during rain events, thus aiding in the effort to minimize stormwater intake into the combined tunnel system in Milwaukee, and ultimately reducing the need to empty the tunnels during heavy rain events in which untreated water, raw sewage, and contaminants enter into Lake Michigan.

MPM has proposed the construction of a Green Demonstration Space that will feature a unique bladder and stormwater collection system that will be interconnected through a series of underground aqueducts that maximize stormwater collection and the system's infiltration properties. The system will be able to manage 32,000+ gallons of stormwater during a 100-year, 1-day rain event, thereby reducing the impact on storm sewers as it relates to volume and also removing Total Suspended Solids. The system will feature such visual elements as a waterfall-like overflow modular reservoir system. A new micro-porous pavement system will take the

form of elegant, meandering paths among the native plantings and a stage area for public performances. The space's infrastructure system will allow for native plantings from Wisconsin such as perennials and grasses that can endure long periods of exposure to drought conditions. Thoughtful native landscaping will focus on visually stunning palettes of plants that visitors can enjoy while following the meandering garden paths or while resting in the hillside seating areas. Placement of the Green Demonstration Space at MPM's main entrance will ensure both high visibility and complete accessibility for MPM's guests, including the tens of thousands of school children who come to MPM each year.

When the project is complete, the space will have been transformed into an attractive public area that uses cutting-edge stormwater management techniques seamlessly designed as a museum demonstration, learning, and entertainment space. The space will showcase ideas for urban farming, elements of green roofing and solar energy, and a system that manages over 32,000 gallons of stormwater during a 100-year, one-day rain event -- all with museum-designed displays that will teach the public about the future of green infrastructure and stormwater management. This space will be used to offer educational programs designed by MPM's own education team. These programs will be held on a weekly basis, weather permitting, and offered to school groups as a program enhancement.

b. Goals and Objectives

The overarching goals of this project are to (1) collect and manage stormwater such that there is a positive impact on the Lake Michigan Basin and (1) educate MPM's 500,000 visitors and the general public about the importance of water conservation such that they begin to consider ways in which they can practice water conservation in their own daily lives. The primary objective of these two goals is the creation of a Green Demonstration Space that can both collect significant levels of stormwater and provide a sustainable example to MPM's 500,000+ visitors and the general public on how they too can help preserve the Lake Michigan basin. The activities that will be undertaken to meet this objective are as follows:

1. Renovation of the project 9,500 square foot area, which will include removal of current non-native landscaping and replacement with native plantings that can withstand long periods of exposure to drought; the installation of a bladder and stormwater collection system that is interconnected via underground aqueducts; the installation of a porous pavement system that is enhanced by rain barrels and cisterns located throughout the project area; and space for educational programming. Combined, these features will provide for a Green Demonstration Space that is effective, educational, and aesthetically pleasing.
2. The creation and installation of outdoor-friendly exhibit components and signage by MPM's exhibit and design teams to tell the green story of MPM, specifically its stormwater collection space, solar panels, and green roof.

3. Promotion of the Green Demonstration Space via a ribbon-cutting and public ceremony for the grand opening of the space to MPM's visitors and the general public. This event will be promoted to the media, and a press release is in the planning process.
4. The creation and offering of educational activities in the space that promote the importance of stormwater management, green infrastructure, and the wise use of natural resources. These educational programs will be designed by MPM's education team and held on a weekly basis, weather permitting, and offered to visiting school groups to select as a program enhancement.

c. Expected Outcomes and Impact on Lake Michigan Water Quality

The outcomes for the proposed project are:

1. The successful management of stormwater from rain events, with a maximum capacity designed around the management of 32,000+ gallons of stormwater during a 100-year, 1-day rain event, thereby helping preserve the Lake Michigan basin and improving water quality in the surrounding environment;
2. The creation of a highly visible public space whose use will be effective in promoting public awareness about stormwater management and MPM's other green infrastructure practices; and
3. An increased understanding in the general public of the importance of water conservation and the careful stewardship of our natural resources.

The impact on Lake Michigan is that significant amounts of stormwater will be conserved in an ongoing manner, thereby helping preserve the Lake Michigan Basin. Because the Green Demonstration Space will have the capacity to manage more than 32,000 gallons of stormwater, meaning it will capture 97% of a 100-year, 1-day rain event, it will reduce the impact on storm sewers as it relates to volume and will remove Total Suspended Solids through the collection and infiltration system.

Also, because the Green Demonstration Space will display numerous on-grade green infrastructure best management practices that improve water quality and help improve the urban environment, project impact will be extended as the hundreds of thousands of visitors to MPM begin to consider the importance of water conservation and how they can implement conservation practices into their personal daily lives to help preserve the Lake Michigan basin.

Yet another impact of the proposed project will be increased awareness on the part of the general public concerning The Fund for Lake Michigan, its mission, and the role the Fund plays in protecting the fresh water in our communities. MPM will recognize The Fund, along with MMSD, as local entities that awarded the grant funding that made the project possible. Name recognition will be accompanied by overviews of the organizations' purposes and contributions to water quality and conservation.

d. Anticipated Challenges or Risks and How They Will Be Addressed

MPM does not anticipate any challenges during project construction and implementation. If any do arise, however, Project Co-leads Hillary Olson and Patti Dew will work with the MPM Director of Facilities along with staff from Hanging Gardens and The Green Team of Wisconsin as needed to identify the source(s) of the difficulty and then develop and implement a corrected course of action. MPM will work closely with the Metropolitan Milwaukee Sewerage District (MMSD) on any special needs that arise in order to address them in a timely and appropriate manner.

e. Partners and Other Organizations

Project partners include The Green Team of Wisconsin (GTW), Hanging Gardens (HG), and the Metropolitan Milwaukee Sewerage District (MMSD). A current partner of MPM who helps maintain as well as provide educational opportunities through expertise and volunteerism (e.g., Earth Day 2015), GTW assists local non-profit organizations with their outdoor classroom design, construction, and maintenance as well as assisting with education. HG will oversee the green infrastructure construction components of the project.

The Fund for Lake Michigan will also become a project partner as it is recognized for grant funding and promotes the role the Fund plays in protecting Lake Michigan. MPM will make sure to highlight the mission of the Fund and its commitment to water stewardship and conservation.

As to this project leveraging other funding, it should be noted that MMSD has awarded a grant of \$81,870 to MPM in support of this project. The MMSD grant is conditional upon a 1-to-1 match being secured, and MPM is hopeful that The Fund for Lake Michigan will choose to award a grant of \$80,000 such that MPM is able to meet this requirement. MPM will raise the remainder of funds needed for this project (\$5,400), from individual donors or other sources.

f. Project as Part of a Larger Initiative and Identified as a Priority in a Plan

Larger Initiative

As indicated throughout this application, MPM is a major educational institution that has a strong focus on and commitment to the natural sciences and, in particular, to the surrounding environment. The proposed Green Demonstration Project is a natural extension of this commitment and will in fact complete the Museum's "trifecta" of green infrastructure projects. This trifecta consists of MPM's Green Roof, Solar Panel, and Green Demonstration Space.

With funding assistance from the Metropolitan Milwaukee Sewerage District, MPM recently replaced its aging, traditional roof with a living green roof. This roof not only helps collect rainwater but also provides a place where fresh herbs are grown for MPM's in-house dining area/caterer. With assistance from We Energies and a private donor, MPM recently installed 234 large (4 x 6.5 foot) panels on the south-facing, seven-story, exterior wall of the Museum. This installation constitutes the largest solar wall array on a building in Wisconsin. The panel array is linked to a kiosk inside the Museum that provides visitors with near-real-time data on

the energy being generated by the panels. The kiosk also provides information on outside environment conditions and an overview on how solar panels work.

As noted earlier in the Project Narrative, the proposed Green Demonstration Project will become an essential component of MPM educational programming. Of the 500,000 visitors who turn to MPM each year for educational programs and exhibits, more than 100,000 are students, ranging from very early learners in pre-kindergarten through graduate school students and senior scientists. MPM's educational programs serve students at all levels of learning and of all ages.

Because the Green Demonstration Space will incorporate functional stormwater management with public education and green building techniques, the space itself as well as the education programs offered within it will provide MPM's 500,000 annual visitors and the general public with an understanding of the importance of water conservation and ideas about how they can practice water conservation in their own daily lives. In short, the Green Demonstration Space will enable hundreds of thousands of people per year to see, learn and experience aesthetically pleasing, functional and fun stormwater management practices. Through this project, MPM will create an iconic and usable space that is directly related to volume stormwater control in southeastern Wisconsin.

Priority in a Plan

MPM received signature project level funding from the Metropolitan Milwaukee Sewerage District with a challenge grant of \$81,870 in support of this project.

g. Permits and Approvals

No permits are currently pulled as the project is contingent upon grant funding. Upon notification of grant funding from The Fund for Lake Michigan, MPM's Director of Facilities will work with the project contractors to ensure that all needed permits are in place.

Here, it should also be noted that included with this application are letters from Milwaukee County and the Chairman of the MPM Board of Directors, indicating approval of this project on behalf of Milwaukee County as landowner and the Milwaukee Public Museum's Board of Directors as authorizing entity. Additionally, letters indicating support of the project have been written by leadership from The Water Council, one of the largest corporations with headquarters in Milwaukee, project partners, and the President and CEO of MPM. These letters are also included in this grant application.

3. Project Timeline

Construction and exhibition work is anticipated to take place during the July - September 2017 timeframe. Educational programming and exhibition public impact will be ongoing, offered on a weather-dependent basis.

4. Project Evaluation

Evaluation will be a multi-layered process. Hanging Gardens and The Green Team of Wisconsin will help MPM measure the storm water collection mechanisms to assess the collection, capture, and infiltration rate of the entire system, including the rain barrels, porous pavement, cistern, bio-swale, and native landscaping systems.

MPM will conduct formative evaluations on all exhibitions and educational programs using prototypes with the visiting public. These assessments will ensure the components that are permanently placed outdoors fulfill MPM's educational goals and are structurally sound for outdoor usage. Once the Green Demonstration Space is built, MPM will work in two ways to assess the public usage and understanding of the space: MPM will (1) use tracking studies (unobtrusively watching people using the space, while timing their engagement with each component) and also (2) use direct survey techniques, engaging the public (both passers-by and museum visitors) in their understanding of the exhibition/space, the need for green infrastructure, the impact on our river and lake ecosystem, and any potential changes in their own behaviors that may happen through learning more about the possibilities demonstrated by the project. This information will be collected in an ongoing manner and reviewed by MPM's Director of Education and Public Programs to identify possible program enhancements.

5. Outreach

This project will complete a museum "trifecta" of green infrastructure projects -- something very few natural history museums built before 2000 have. The trifecta consists of MPM's green roof, where rainwater is collected and fresh herbs are grown for MPM's in-house dining area/caterer, the solar panel that is installed on an external wall of the Museum (the largest solar panel array in Wisconsin), and the proposed Green Demonstration Space. MPM staff plan to share project successes concerning green infrastructure programming and design at several annual industry meetings including the following: the American Alliance of Museums, the Association of Science and Technology Centers, and the Association of Midwest Museums.

MPM is excited that the Green Demonstration Project will be a true demonstration space that is an educational resource for organizations across the city and beyond. MPM will share project information and outcomes with other museums that seek to create a similar space and also with the Water Council. Additionally, project partners Hanging Gardens and The Green Team of Wisconsin, Inc. will use the project as a demonstration and showcase model for similar projects for years to come.

6. Sustainability

MPM is committed to the long-term success and sustainability of this project. An agreement has been reached between MMSD and MPM that stipulates that MPM will operate and maintain the Green Demonstration Space for at least 10 years. To ensure compliance with this agreement, MPM will prepare an annual maintenance report to be filed with MMSD by

December 31 each year, summarizing the project's performance and the maintenance activities that occurred during the preceding twelve months. In addition, Milwaukee County requires MPM to operate and maintain the building and grounds of the Museum while under the Lease and Management agreement with the County. This Agreement currently runs through December 31, 2022.

Similar to MPM's green roof, maintenance of the Green Demonstration Space will be absorbed into the daily operations of the Museum's facilities staff as normal upkeep and maintenance. MPM's facilities staff and security staff will be responsible for the oversight and care of this area of the Museum's grounds and any equipment or building needs connected to the Project area.

7. Capacity to Carry Out Project

MPM possesses the capacity to carry out the Green Demonstration Project due to the qualifications of the persons associated with this Project and the MPM staff, in particular MPM's Education, Facilities, and Security teams. As indicated in the biographical summaries provided in this application, project co-leads Hillary Olson and Patti Dew bring to the project educational and financial expertise that will ensure project success. Similarly, project partners Hanging Gardens and The Green Team of Wisconsin bring to the project expertise in green infrastructures for stormwater management and environmentally-focused, sustainable landscape systems.

MPM's facilities and security staff will be responsible for the oversight and care of this area of the Museum's grounds and any equipment or building needs connected to this Project area. The oversight of the implementation/construction phase will be the responsibility of the Museum's Director of Facilities, with assistance from his maintenance and environmental services staff as well as any contractors needed for specialized work. The Director of Facilities has managed numerous construction and renovation projects in the past and has intimate knowledge of the Museum's building and grounds.

Finally, it should be noted that \$81,370 of the \$167,270 needed for this project has already been secured through the challenge grant that has been awarded by MMSD. However, this grant award is contingent upon a match. It is hoped that The Fund for Lake Michigan will choose to award a grant of \$80,000 such that this project can move forward, helping protect Lake Michigan and providing educational programming for the community at large concerning the importance of resource management and in particular freshwater conservation through green infrastructures and green living.