

Date: July 3, 2012

To: Supervisor Gerry Broderick, Chairman; Parks, Energy and Environment Committee

From: Ellen Censky PhD., MPM Senior Vice-president and Academic Dean
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CC: Jay Williams, MPM President and CEO
Chris Abele, Milwaukee County Executive
Marina Dimitrijevic, Chairwoman County Board of Supervisor
Greg High, Director of Architectural and Engineering Division

Subject: Informational Report on the change of appearance to the Milwaukee Public Museum's south elevation in conjunction with the approved project (W011405) for repair and replacement the existing marble façade.

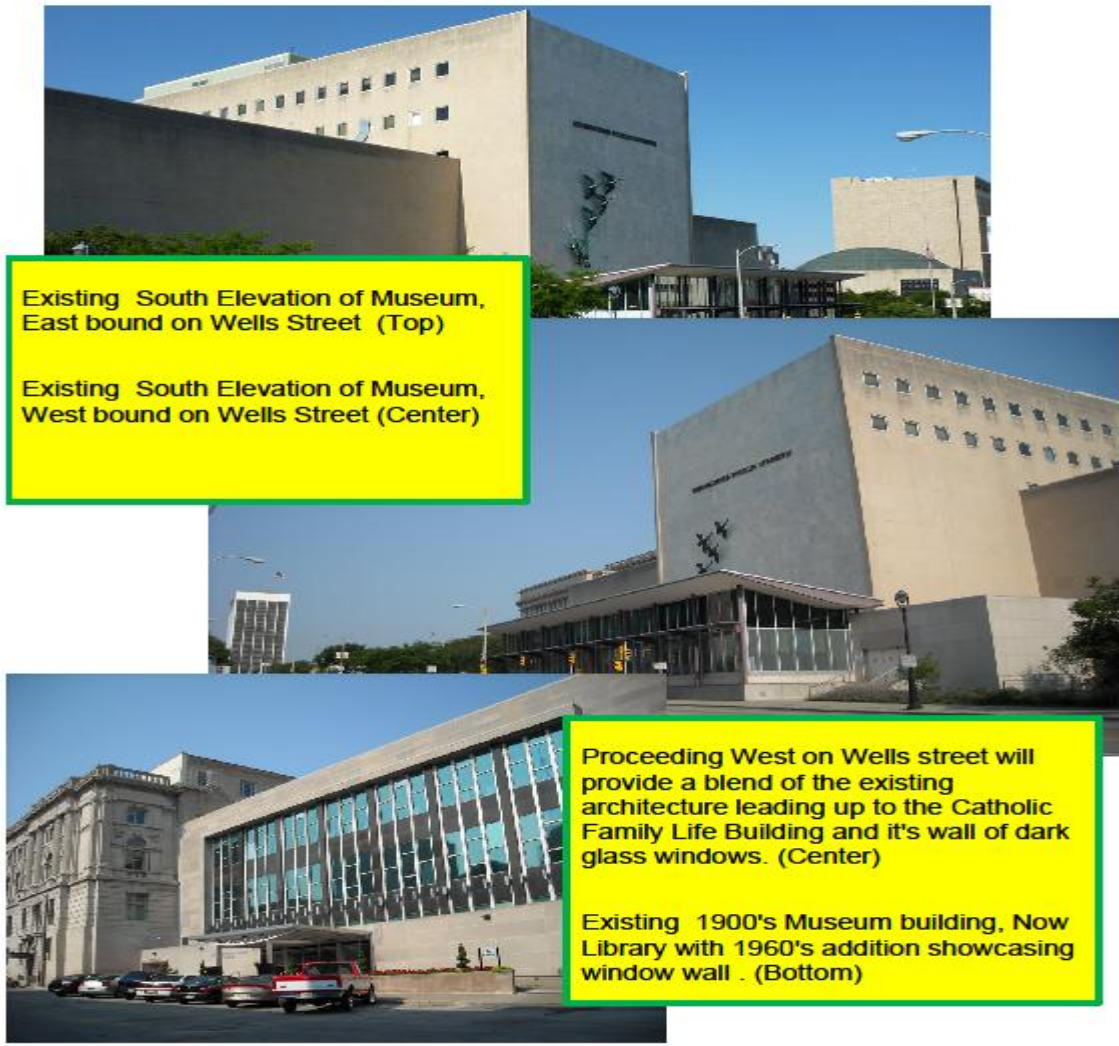
Background

In 2011, the Milwaukee County Board approved the funds to replace the marble façade panels on the north and south face of the building. In exploring all options for replacement products and keeping the County's Green Print program in mind, the Museum, in consultation with the County's Architectural and Engineering Division and HGA Architectural firm determined that it is feasible and within budget to replace the existing natural marble stone with Photovoltaic (PV) glass panels on the south elevation (Wells Street view) of the Museum. This will result in a substantial change to the look of the building and it is for this reason that MPM Inc is making this presentation to the Parks, Energy and Environment Committee.

As is normal for an institution that is 130 years old, the Milwaukee Public Museum has gone through many physical transformations, from new additions to structural changes to the outside appearance. The replacement of the existing marble, which has no historical significance to the architectural style of the Museum, will again bring about a new transformation. The modification that we seek today results from several identified needs -- safety in stabilizing the structural façade, enhancement of an inadequate building envelope, and integration of a new technology -- Photovoltaic Panels. The latter two improvements will reduce energy use and ultimately improve our urban setting for generations to come.

Process and Design

As a first step in assessing the potential products, the team (A&E, Museum and HGA professionals) looked at the request by the County to replace the existing marble and substitute or replace failing components. The marble replacement path from technical perspective and budgetary review would increase the budget by \$750,000. A new and innovative approach was needed to not only secure the failing marble but increase the efficiency of the buildings envelope.



Existing South Elevation of Museum, East bound on Wells Street (Top)

Existing South Elevation of Museum, West bound on Wells Street (Center)

Proceeding West on Wells street will provide a blend of the existing architecture leading up to the Catholic Family Life Building and it's wall of dark glass windows. (Center)

Existing 1900's Museum building, Now Library with 1960's addition showcasing window wall . (Bottom)

The proposed design resolves the 50-year-old problems of ineffective or nonexistent insulation, and lack of moisture barrier. HGA consultants reviewed the original design from the 1960's and found it to be an inefficient system that encapsulated the building, and did not provide a sustainable environment to preserve the collections and displays of today's museum. From the exterior, the side end return walls of the marble elevations allow for the installation of a vapor barrier and insulation with integral framework that can receive many types of cladding that include Photovoltaic panels. By using PV Panels as cladding we will be producing electrical energy that will result in energy cost savings in excess of \$300,000 over 30 years. The installation of PV Panels will provide a physical skin life and durability equivalent to glass panels. The PV Panels nearly black in color with a reflective sheen not unlike glass will add dimension to the Wells Street exposure. The new contrasting look will signify that you have arrived at your destination, The Milwaukee Public Museum.

Our new look will take into consideration the prominent placement of Milwaukee Public Museum's name and bronze sculpture now lost in near obscurity to other locations in the photographs below.



New Prominent Location of Museum Signage and Bronze Sculpture
Existing (Top), and New Location illustrated in artist rendering (Center)

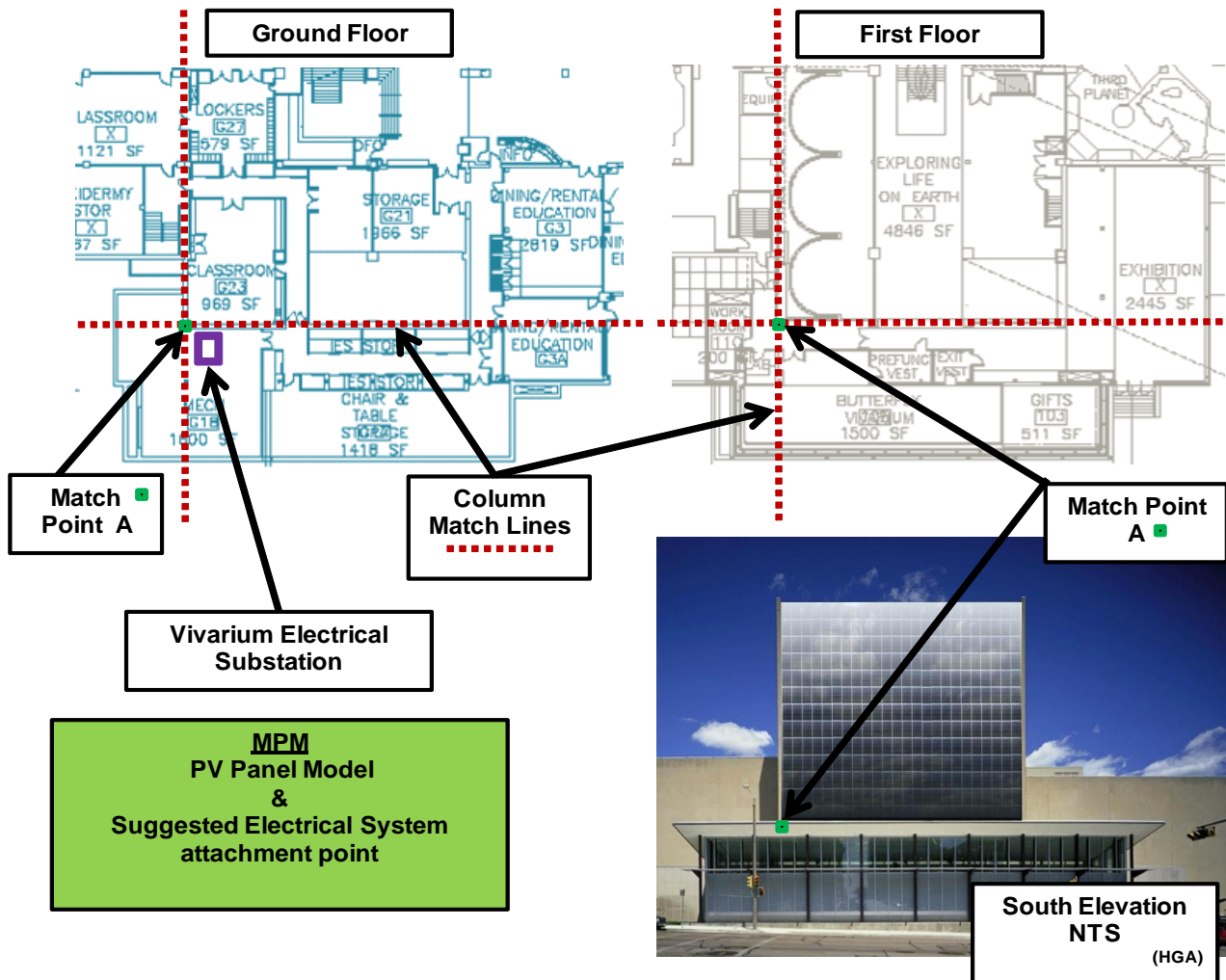


New South Elevation shown with PV Panels illustrated by artist rendering (Bottom)

Technical

Photovoltaic Panel installation on a vertical surface presents no difficulty and has been installed on many building throughout the world. The same mounting techniques that are utilized in hanging glass panels are employed with the twist of incorporating a rated wiring system for the PV Panels. The racking system is custom fit to the panels specified for the project. In our case Helios Panels or their equivalent will be specified so that the matrix of panels will equal 234 producing a panel count similar to the former marble layout. This pattern of panels will allow for proper spacing during installation or if maintenance is needs due to damage. Fortuitously the southeast corner of the PV Panel racking system is directly over a major electrical distribution point. This positioning adds the benefit of saving time and cost for the electrical component installation. The vertical mounting system also acts as a rain wall protecting the insulation and moisture barrier behind its stunning image. There is the estimated cost of electrical components and installation that brings its full cost still within the approved budget range. The benefit of PV is that there is no other façade cladding product that will produce 83,000 watt-hours of power per year at an estimated 30 year savings of \$300,000 beyond its cost to install. The graphic image below depicts the alignment of the PV Panels and racking system on the south wall, and its relationship to the electrical substation within the building.

PV Panel Installation Graphic



Financial

The PV Panel alternative is the most comprehensive method to capture a cost savings in replacement of the marble façade as previously discussed. In the first five years the savings will amount to nearly \$50,000 taking into account historical Public Service Commission yearly averages from 2000-2011. This projected savings does not take into account the possible 6% compounded yearly gain on investment that the system could provide in a good economy. The statistical data provided in the Cost Summary Table indicates that the electrical infrastructure cost will be recouped by the 15th year of operation. This evaluation takes into account a one to one cost equivalency between PV Panel product, racking, and installation that must take place with any other system of cladding as proposed. The engineering estimates from HGA shows data that is similar. This additional data has been updated by using a model of 234 PV Panels that produce an energy savings improving the bottom line of the project. The Photovoltaic Feasibility Study by HGA (pdf file) is attached for reference. The additional data compiled on installation was obtained from local industry contractors and product suppliers specifically for this project by MPM. The project budget of \$1,400,000 includes \$200,000 in A&E fees, and \$110,000 in contingencies. Items not represent in the budget are; possible salvage value for approximately 14,000 s.f of marble, direct product purchase by Milwaukee County, and the funds that may be available through educational programming from sponsors like Milwaukee Shines.

Cost Summary Tables 1 A&B							
Cost Summary and Paybacks with No Incentives, Table 1A							
5 Year Block Summary	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30yr Totals
PV cost projection beyond other façade claddings	(189,000)						(189,000)
Maintenance and Insurance Cost (30 year projection)	(7,437)	(8,597)	(9,967)	(11,554)	(13,396)	(15,528)	(66,479)
kWh Savings	49,971	62,218	77,455	96,450	120,087	149,517	555,698
Years	2012-16	2017-21	2022-26	2027-31	2032-36	2037-41	
Total Projected Payback							300,219
(less Installation and Maintenance with No Incentives, 30 years)							
Cost Summary and Paybacks with Incentives, Table 1B							
5 Year Block Summary	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30yr Totals
PV cost projection beyond other façade claddings	(189,000)						(189,000)
Maintenance and Insurance Cost (30 year projection)	(7,437)	(8,597)	(9,967)	(11,554)	(13,396)	(15,528)	(66,479)
Fed Tax Credit or Treasury Grant (Yr. 1 only if applicable)	56,700	-	-	-	-	-	56,700
Value of all first cost incentives after taxes (Yr. 1 only)	56,700	-	-	-	-	-	
Federal Depreciation Value (only if applicable)	46,807	1,388	-	-	-	-	48,195
State Depreciation Value (only if applicable)	12,326	366	-	-	-	-	12,692
kWh Savings	49,971	62,218	77,455	96,450	120,087	149,517	555,698
Years	2012-16	2017-21	2022-26	2027-31	2032-36	2037-41	
Total Projected Payback							417,806
(Less Installation and Maintenance with Incentives and Tax Credits, 30 years)							

Mission, Education, and Sustainability

The mission of the Milwaukee Public Museum is to *inspire curiosity, excite minds and increase desire to preserve and protect our world's natural and cultural diversity through exhibitions, educational programs, collections and research*. Implicit in this mission is the commitment of the museum to providing and promoting a healthy and sustainable environment for staff and visitors through standards and practices outlined by the US Green Building Council's Leadership in Energy and Environmental Design. The MPM policy emphasizes exploring the use of sustainable alternatives when replacing or repairing the facilities. For example, when the roof on the 6th floor portion of the building needed to be replaced, the museum sought additional funding to install a green roof. The museum also created an exhibit on green roofs showcasing their benefits to the museum and to the community and provided programming for middle school children on green roofs and sustainability.

The museum's plan to replace the marble panels with photovoltaic panels on the south face of the building is a similar project. It meets to goals of the MPM Sustainability Policy. We will also have a small exhibit that showcases how solar panels work and what benefits they will provide to the museum and to the community. This will also provide us with additional demonstration opportunities in our programming on environmental sustainability.

This project also meets two of the goals of Milwaukee County's Green Print Program, -- to retrofit public buildings with high-performance, energy efficient technology and to examine the use of renewable energy sources.

The Photovoltaic Panels will provide a very visible showcase for the museum, for the county, and for the city to demonstrate its commitment to protecting and sustaining the environment thus improving the quality of life for citizens of the county.