



VECTORWORKS CASE STUDY



CREATING SUSTAINABLE DESIGNS  
WITH VECTORWORKS ARCHITECT



A LEADER IN COMBINING  
SOLAR-ELECTRIC—  
OR PHOTOVOLTAIC—  
TECHNOLOGY AND  
ARCHITECTURAL DESIGN,  
NEW YORK FIRM KISS  
+ CATHCART HAS BEEN  
CREATING AWARD-  
WINNING GREEN DESIGNS  
WITH VECTORWORKS FOR  
MORE THAN 20 YEARS.

Sustainable design is the inspiration for all Kiss + Cathcart projects. And the firm relies heavily on VectorWorks Architect's 2D/3D hybrid environment technology, giving them the power of both an advanced drafting and presentation solution and an intelligent, robust virtual modeling program with high-quality rendering capabilities to bring its designs to life.

VectorWorks has been the Brooklyn firm's preferred design software since shortly after the firm's inception in 1983, back in the days when the program was known as MiniCAD.

"VectorWorks is very simple and intuitive," says Kiss + Cathcart firm principal Greg Kiss. "We have not found another program that approaches its combination of features and ease of use. We also like that we can see on screen exactly what a drawing is going to look like—much more so than with other CAD software. And VectorWorks' flexibility gives us multiple ways of working on things."



## DESIGNING IN 2D/3D

The firm begins designing in 3D right from the start, with initial sketch ideas done in 3D, and then switches into the 2D/3D hybrid environment to save design time.

"That we don't have to keep the computer model separate from the drawings, don't have to go back and forth with any changes throughout the design process and can update things in both plan and model automatically are big advantages to using VectorWorks. It saves us a tremendous amount of time when, for example, a door can be shown as a line in plan and a 3D door when you're in the model without having to take extra time to design it again," says Kiss + Cathcart architect Clare Mifflin.

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## NYC SUBWAY GOES SOLAR

For the award-winning reconstruction of the largest above-ground station in the New York City subway system, the New York firm designed a 76,000 square-foot glass and steel structure using an innovative panelized construction system of semi-transparent photovoltaic modules. These solar modules function both as enclosure and a source of approximately 250,000 kilowatt hours per year in renewable energy—the equivalent of the usage of approximately 40 single-family houses.

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The Stillwell Avenue terminal train shed was designed to meet the demanding maintenance and operations requirements of New York City transit. According to Kiss, it will stand as a major civic gesture by New York City transit in promoting the use of renewable energy and providing the public with a beautiful transit facility, as well as a catalyst for the revitalization of Coney Island.

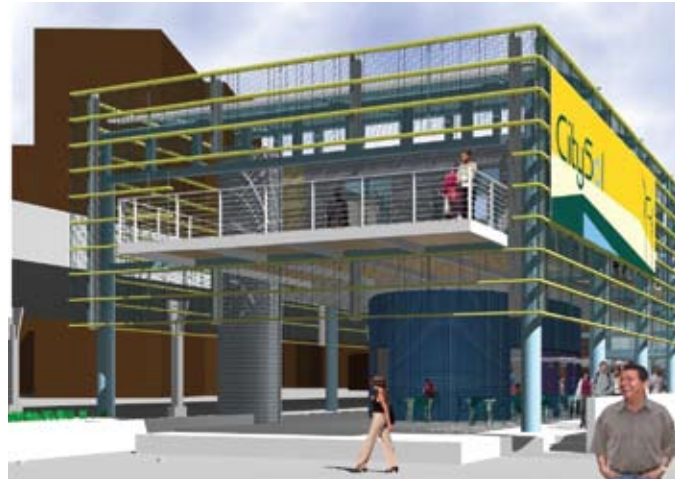
"The Stillwell project had very stringent maintenance requirements, which we were able to demonstrate how to meet using VectorWorks Architect," says Kiss. "We created 3D diagrams to help the client visualize the roof and exploded isometrics in 3D using VectorWorks to demonstrate how the solar panels could be removed for maintenance. We relied heavily on 3D modeling to resolve many intricate geometrical conditions involving the intersection of solar glass, rain gutters, maintenance tracks, and so on. We also exported data from VectorWorks to other programs for electrical and day lighting simulations."



# DEMONSTRATING NET ZERO ENERGY CONSUMPTION

Working with Ove Arup and Partners, Judith Heintz Landscape Architecture, and exhibit consultants Main Street Design, Kiss + Cathcart is currently involved in creating Solar 2, New York City's first solar-powered "Green Energy, Arts, and Education Center" and the only platinum LEED Certified "net zero" building in New York City. Based on its prototype Solar 1, Solar 2 will be a much larger facility designed to meet the ever-growing demand for environmental education. Also known as the Stuyvesant Cove Environmental Learning Center, it will be located on the East River in Stuyvesant Cove Park.

The 8,000 square-foot facility will replace Solar 1 and set the standard for building performance, with the goal of becoming a hub of environmental activity in the city. Solar 2 visitors will experience first-hand what it means for a building to have minimal impact on the environment. As they make their way through the building, visitors will experience building systems directly and through a series of interactive exhibits. Designed to achieve a LEED Platinum rating and "net-zero" energy use, Solar 2 will minimize its impact



on the environment both locally and globally, while generating more energy than it consumes. Among the energy efficient and sustainable technologies used will be geothermal wells, building-integrated photovoltaic panels, solar hot water, daylighting strategies, recycled building materials, rainwater collection, and more.

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The project presented Kiss + Cathcart with several challenges. For starters, there was opposition from the local community to having any building at all in the park, as the prevailing sentiment was that a building would encroach upon the park too much. Because several other parties, including fundraisers, environmental organizations and technical advisors, were also involved in providing input, it took a long time to arrive at a schematic design that everyone agreed upon. But VectorWorks volumetric 3D



renderings, animations, and photorealistic models helped the firm communicate design intent. "The initial RFP included a lot of renderings of the site to show volumetric 3D," says Miflin. "Then we did animations of people walking through the park and approaching the building, as people were concerned the building was going to be too large for the park, and showed them at the community board meetings, so community members could get an idea of the whole scale of the park and building. Because we had so much input from people who didn't know how to read architectural drawings, having VectorWorks 3D models and renderings really helped them see how the building came together and how it fit into the environment very early on in the project."

The project's site provided additional challenges. Since it is situated below the flood plane, the firm raised the bottom of the building. The building also had to have a net zero energy consumption, so the firm designed a roof that was larger than the interior space to provide enough square footage to accommodate the 6,500 square feet of solar panels that would provide electricity for the building. This array can generate up to 92,716 kWh per year, representing 108 percent of the projected demand of 86,030 kWh per year.

A northlight skylight system provides daylight for the building's second floor. As a result, there is less direct sunlight and solar heat gain, with a significant reduction in glare. Vertical window glazing will provide enough natural daylight for the narrow building's first floor for approximately 80 percent of peak hours.





## SETTING SUN POSITIONS AND CREATING SOLAR ANIMATIONS

Because the site has a north-south orientation, the firm also had to devise a solution to provide enough shade for the long east- and west-facing glass facade in the summer. A seasonal deciduous vine will wrap around the whole building to provide shade in the summer.

"We found VectorWorks' set sun position and create solar animation commands extremely useful on the Solar 2 project for seeing how the sun would penetrate the structure at different times during the day or how things would be shaded," says Mifflin. "We will often estimate from a solar animation how much the panels will be shaded in the course of a day. When we can tell it looks like the building will be in the sun 80 percent of the day and shaded for 20 percent, it helps in figuring out how much energy will be saved and how much will need to be produced."

The Solar 2 Green Energy, Arts and Education Center is expected to open to the public in 2009.

