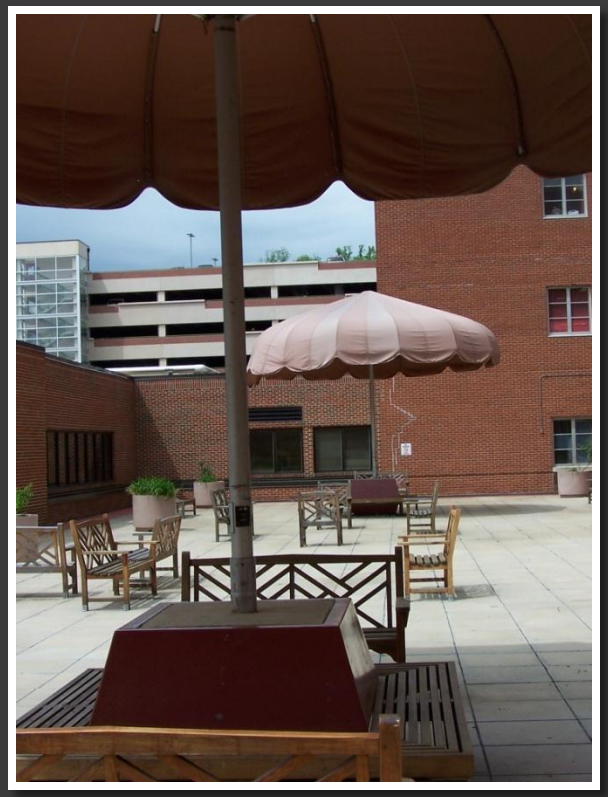
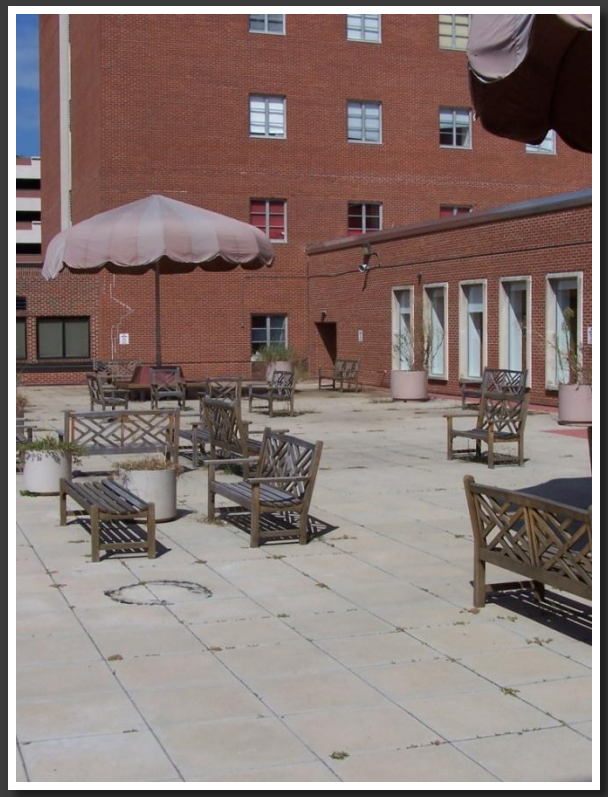
NIH LIBRARY GREEN ROOF TERRACE

Completed in 2009

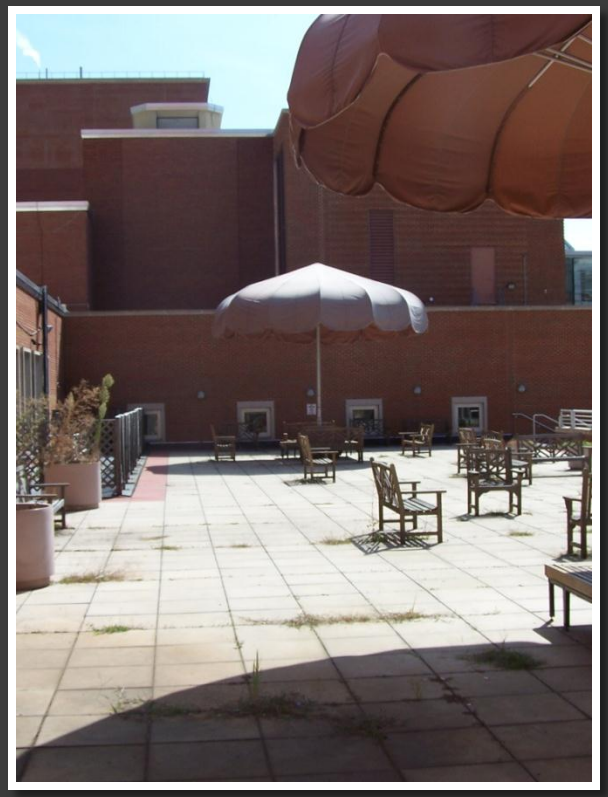
This was the rooftop patio in 2008.



The two umbrellas were torn and faded and provided little overall shade.



The patio area had not been maintained and the entire area was unbearably hot in the summer.

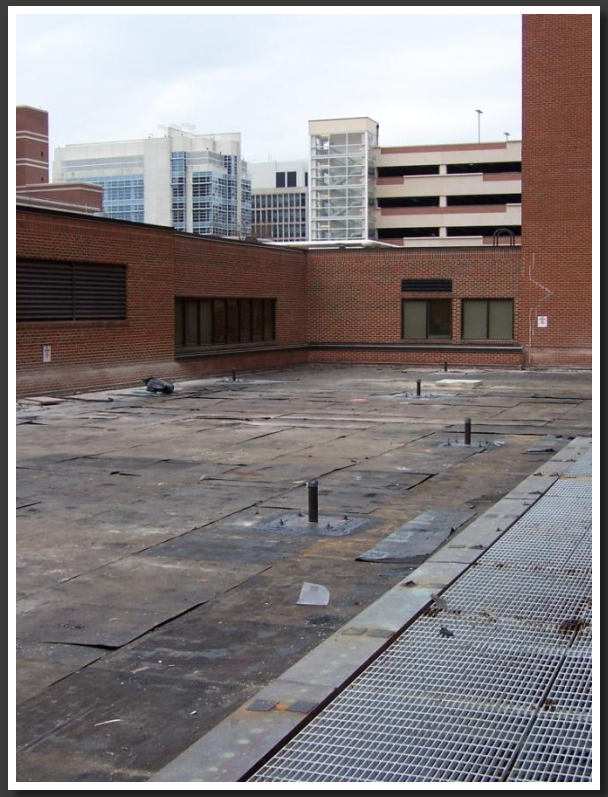


Discolored tiles and weeds made the entire area nothing more than an eyesore.


South Dr
South Dr

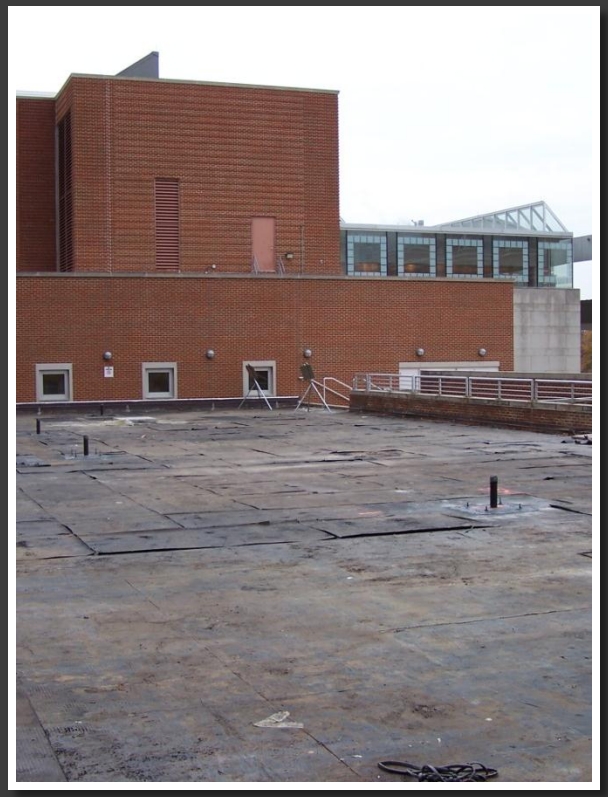
De-construction began in 2008 with the removal of the umbrellas. The stands were constructed of solid concrete that took days to remove.

Workers hand carried each concrete tile onto pallets and transported them to a staging area on the outskirts of campus.



Once all of the tiles and excess material were removed the canopy stands were installed

This window will become the new entrance into the NIH Library.

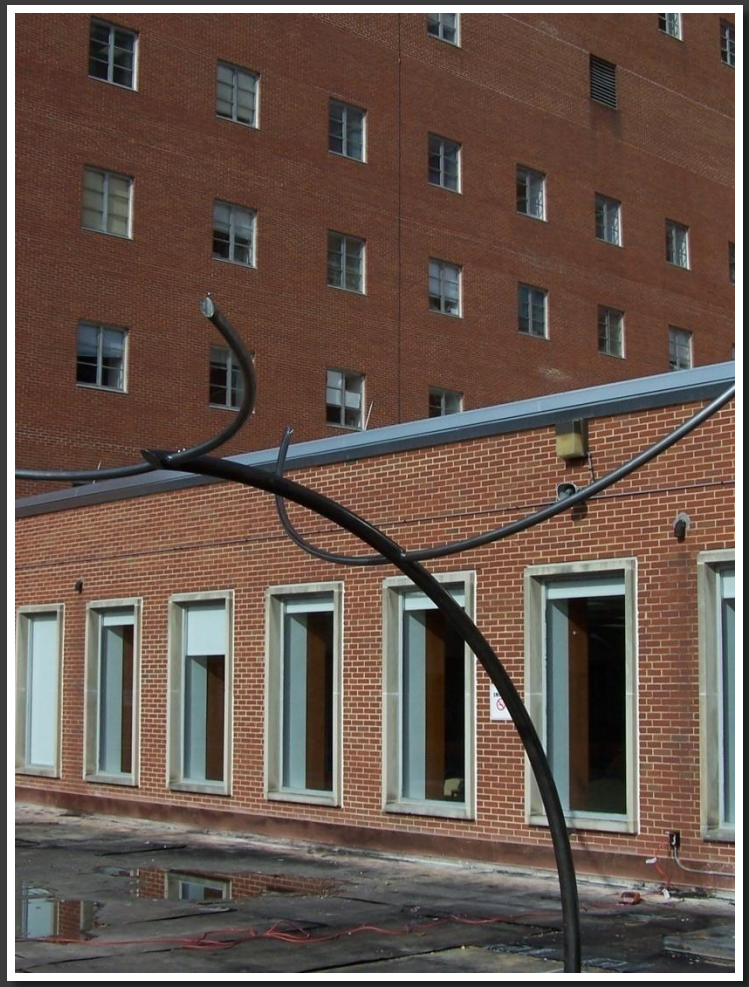


This picture was taken from the opposite end of the patio looking back at the South Entrance of the Clinical Center.

A concrete saw was used to create a lip for the new copper lining that was used to protect the wall and roof from water and soil.

Each stand was attached directly to the roof deck with bolts and then sealed.

An aluminum box was then fitted around the stand and filled with a material that creates a watertight seal.



The rest of the stand was then assembled and attached to the base.

Then the canopy material was attached creating the Tsunami shade structure.

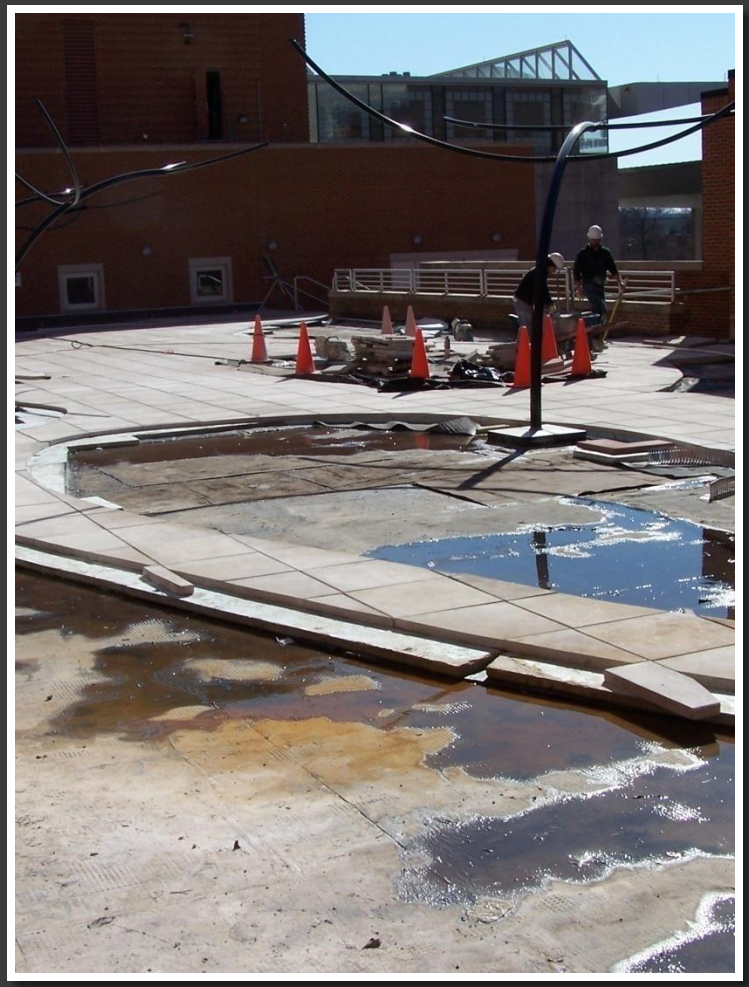
The Facility Team designed a poster that was used to tell NIH staff what was being done on the patio.

The roof atop the reading room was not able to accommodate a full green roof so a flower box was built along the leading edge of the roof line. Flowering vines will cascade down the brick façade from here.

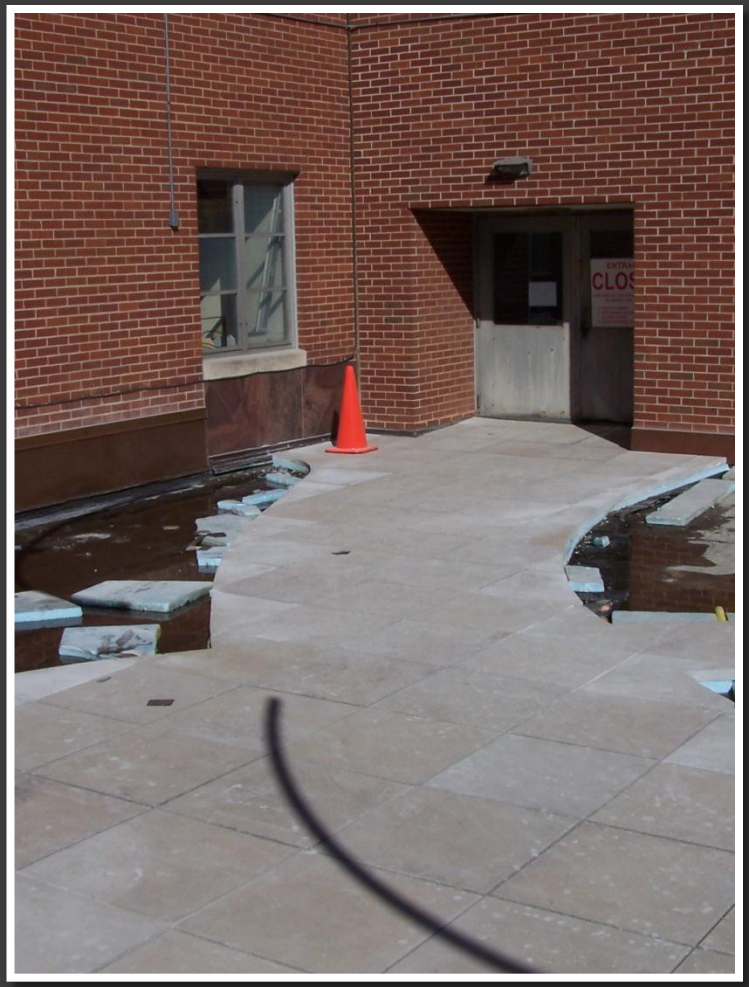
Foam insulation tiles were placed wherever the concrete tiles would go.

One worker then laid out the pattern that would be used to cut the concrete tiles and insulation from.

A concrete saw was then used to cut the tiles forming the plant beds



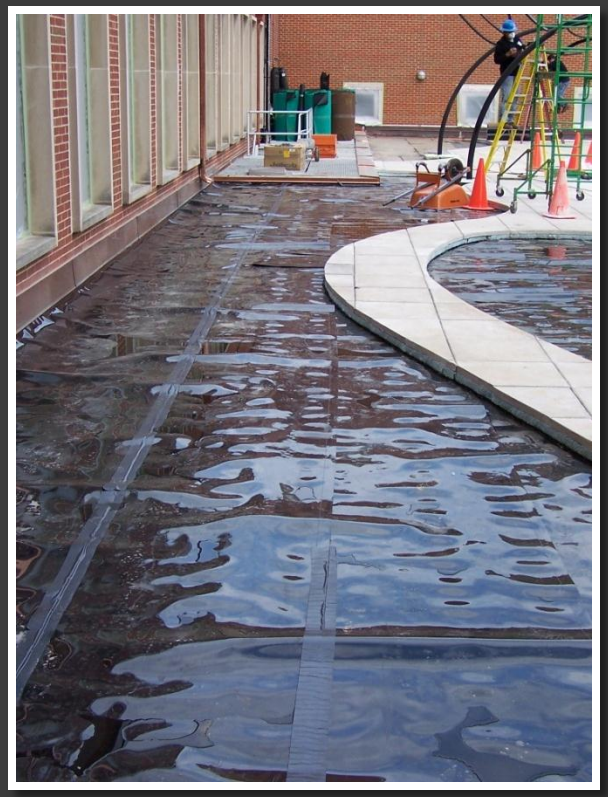
Here are more examples of the curved cuts that were made.



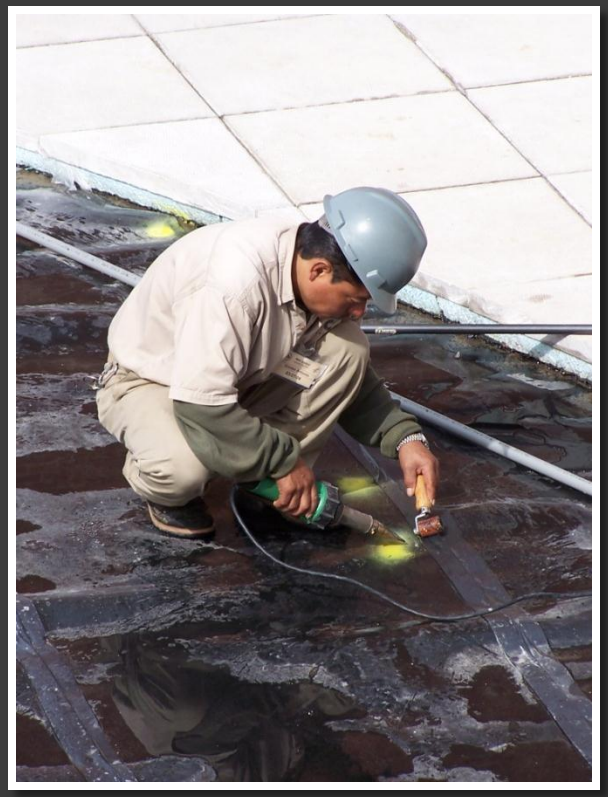
This is a walkway that will serve as an emergency exit for the NIH Library

A beautiful copper cover was added to accent an existing stairwell.

Piping for water and electricity were added.



A heavy duty protective barrier was laid out.



Then a worker used a heat gun to melt the seems together.

At this time, work began on the vestibule that would become the entrance to the patio from the Library reading room.

Electrical conduit and relay boxes were installed for light fixtures

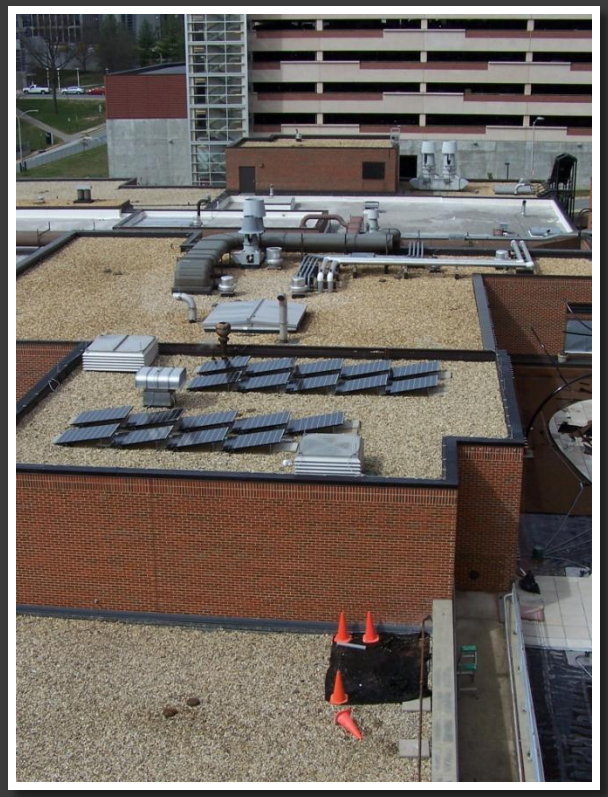
Nice copper downspouts were installed to direct water from the flower box to the terrace.

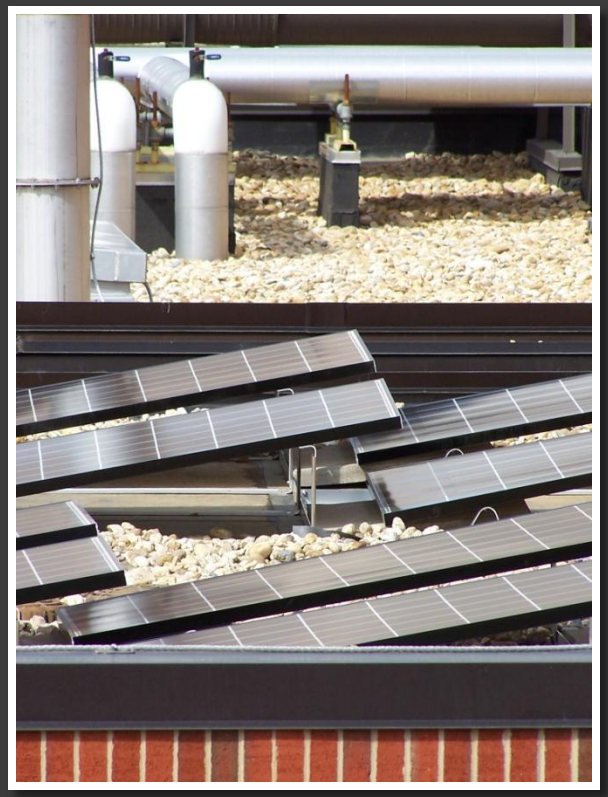
A concrete base was created for the 1500 gallon water cistern.

The cistern also required a retaining wall be built.

Piping was laid for pumping water from the cistern up to the terrace plant life.

Ground had to be dug up around the cistern for the piping.



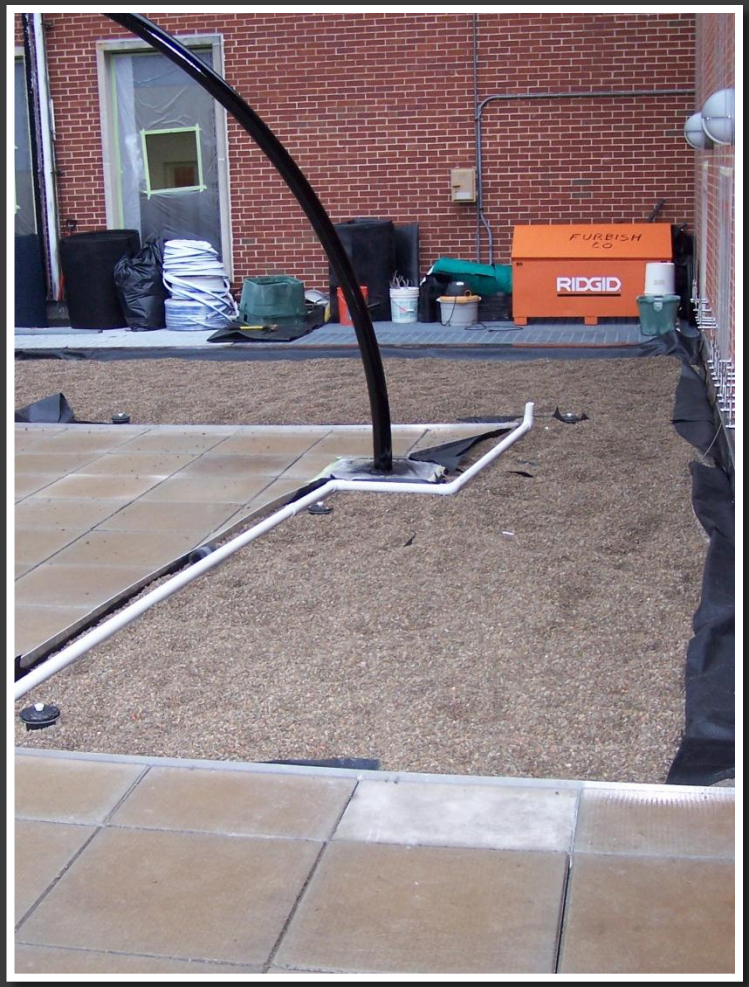


While work continued on the terrace and cistern workers also installed an array of solar panels (photovoltaic panels) on an adjacent building. Solar energy will be used to power the water pumps to and from the cistern, lighting on the terrace, and a water feature that will be installed later in the year.

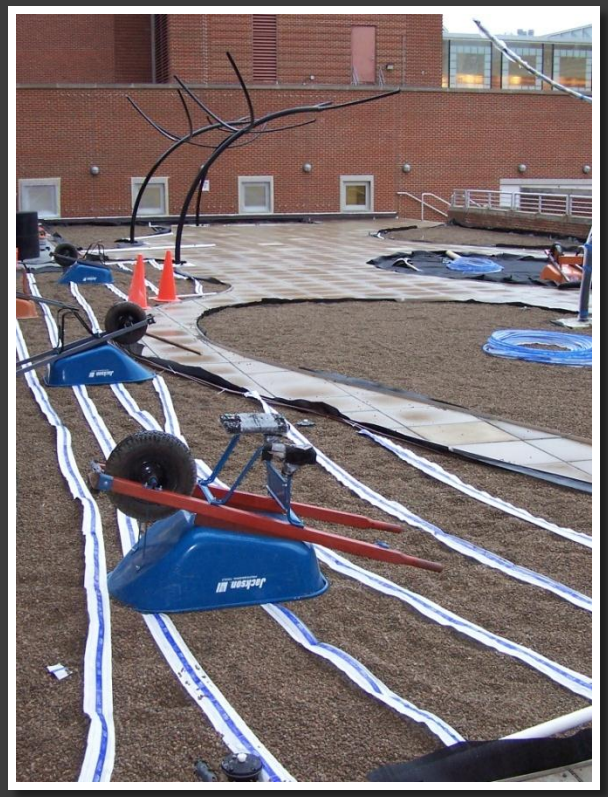
Here workers are laying out additional layers of green roof materials.
Note the flower box to the right of this picture with its protective barrier.

Aircraft grade cable was added to the wall that will allow vines to grow up the wall, further reducing the terrace heat levels.

Here you see the different layers of roofing material and the aluminum edging.

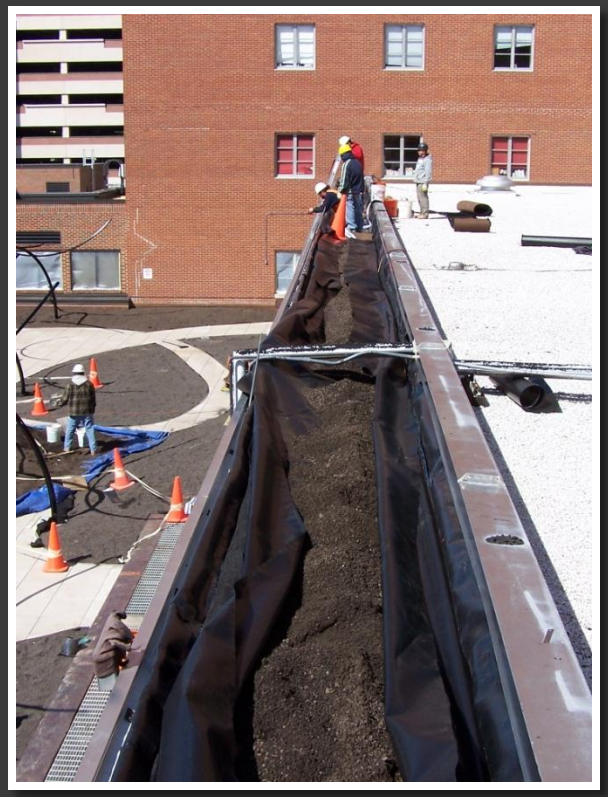


At this point, a fine rock was laid out on top of the roofing material.

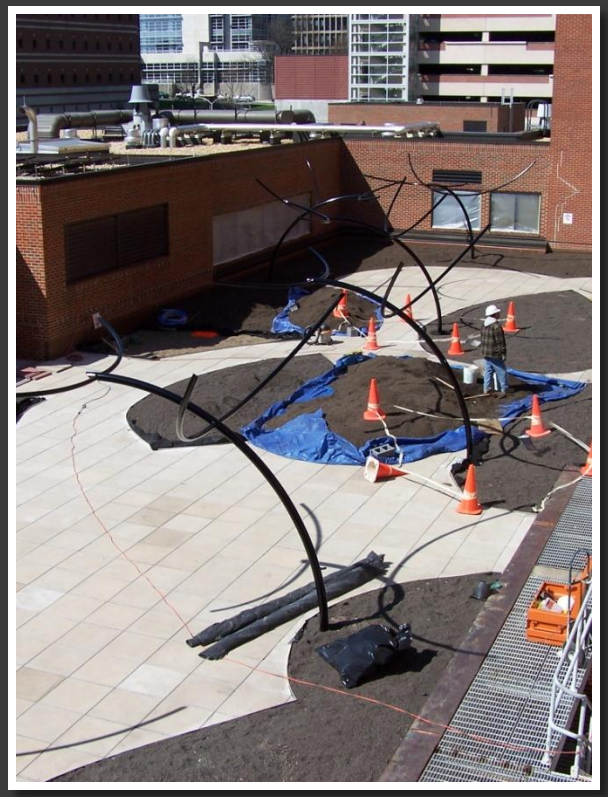


A water irrigation system called KISSS was installed overtop of the fine rock material. The system will use rainwater collected in the cistern to water the various plants throughout the terrace.

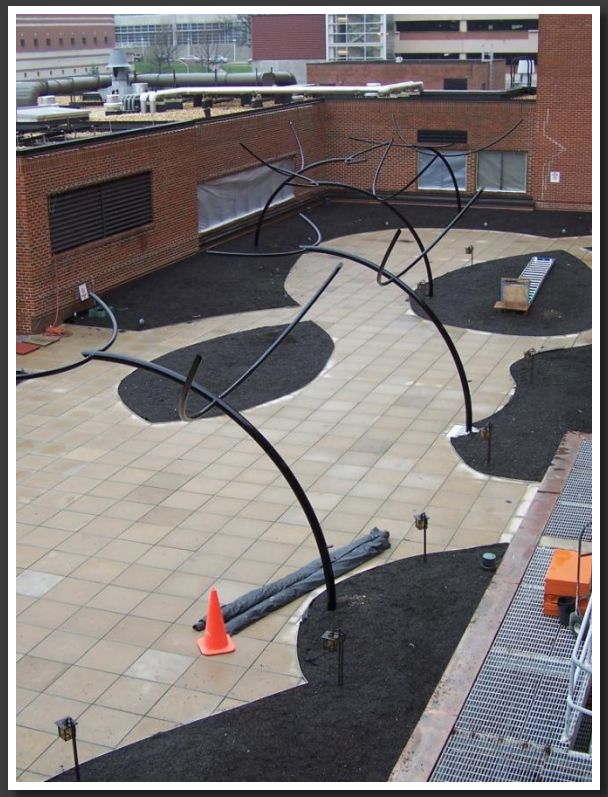
Enriched soil was then put on top of a weed barrier atop the fine rock.



Soil was carried by bucket up to the flower box.



Here you see the soil in most of the plant areas on the terrace.



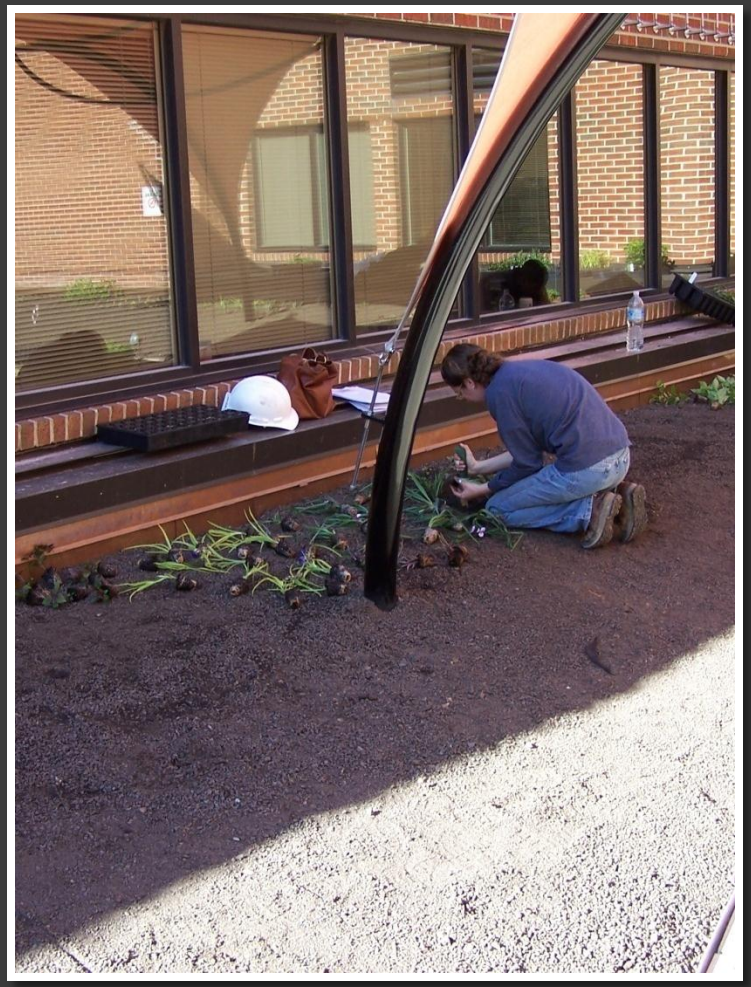
At the end of the day the soil was given its first test by mother nature.

Workers broke through the existing window and brick to create a doorway.

By days end the window started to look like a doorway.

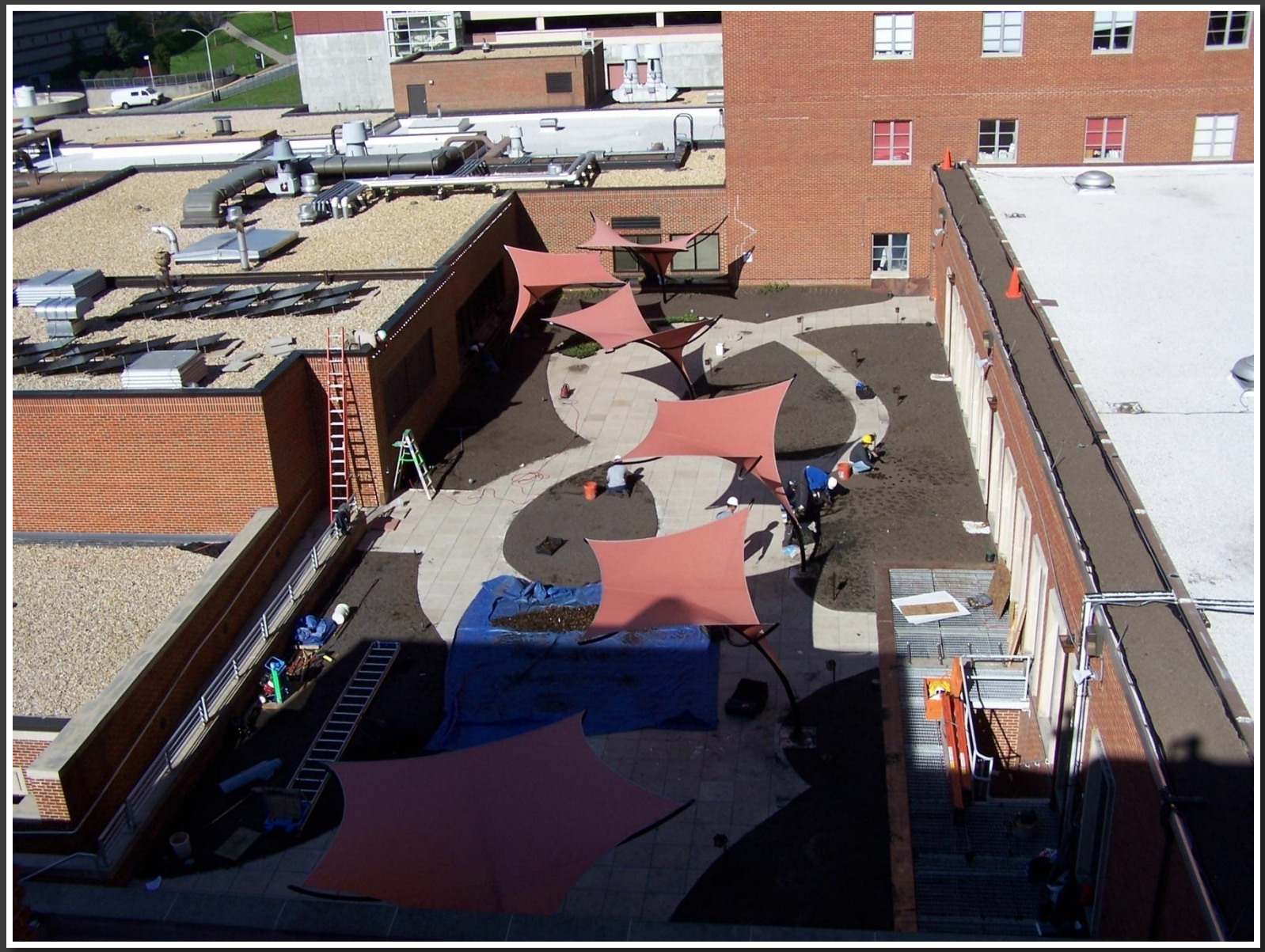
In one day the rest of the interior vestibule was built.

With only three days left until the Grand Opening
workers began to install the green roof plants.



One area of the terrace was set aside for larger plants requiring deeper soil.

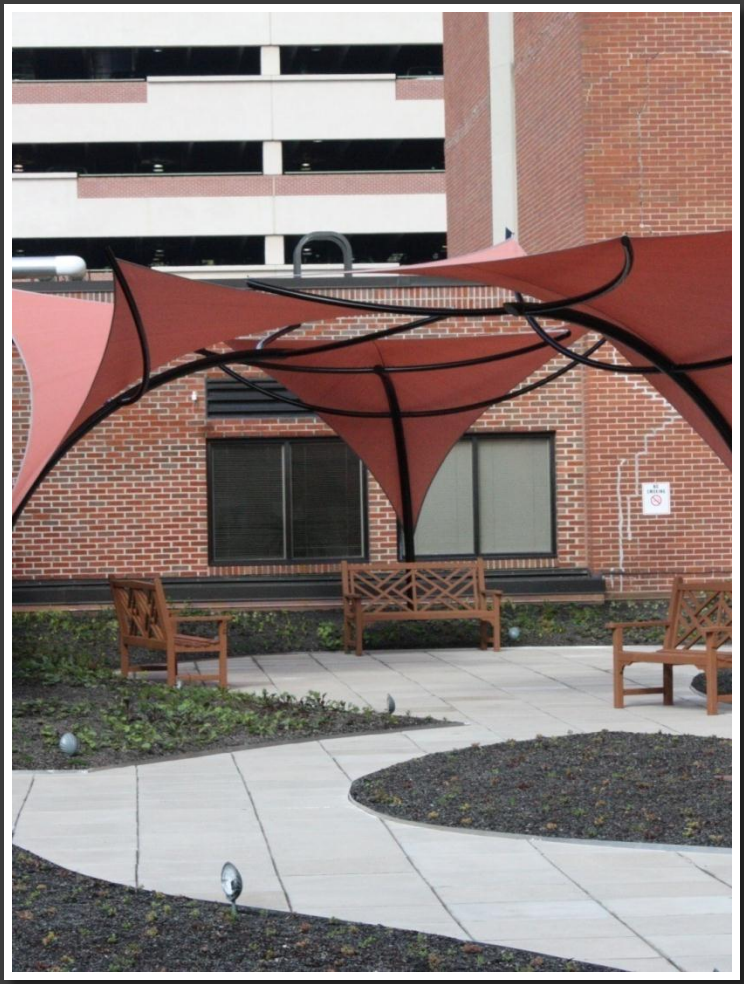
This area was set aside for medicinal plants that correspond to NIH research.

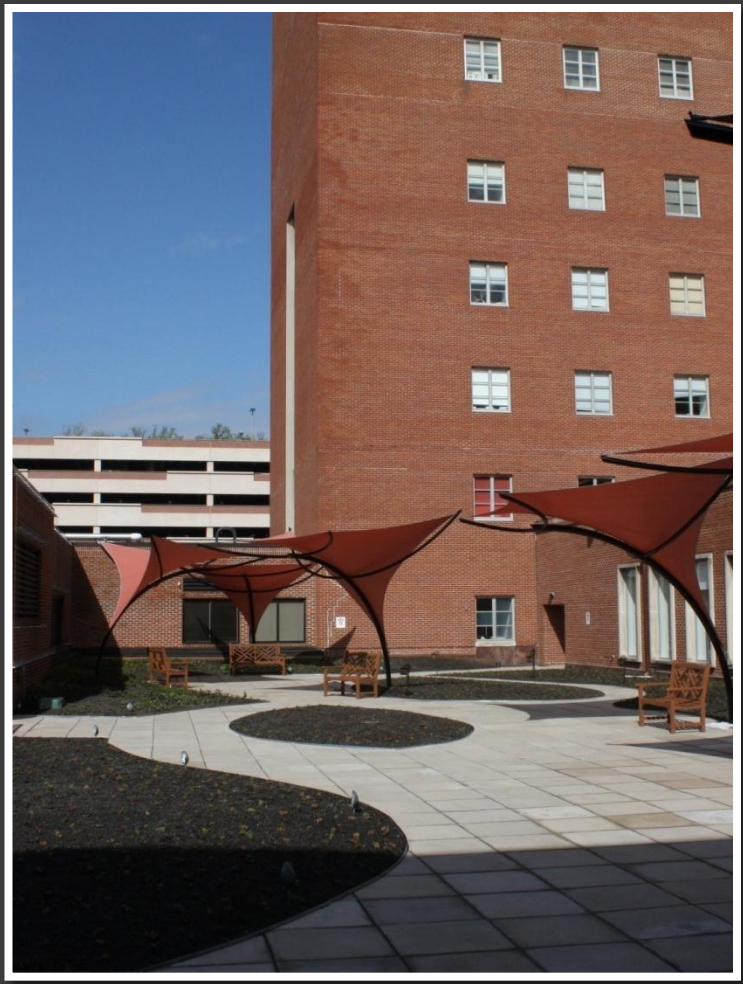


With only days left before the Grand opening
work is going on everywhere.

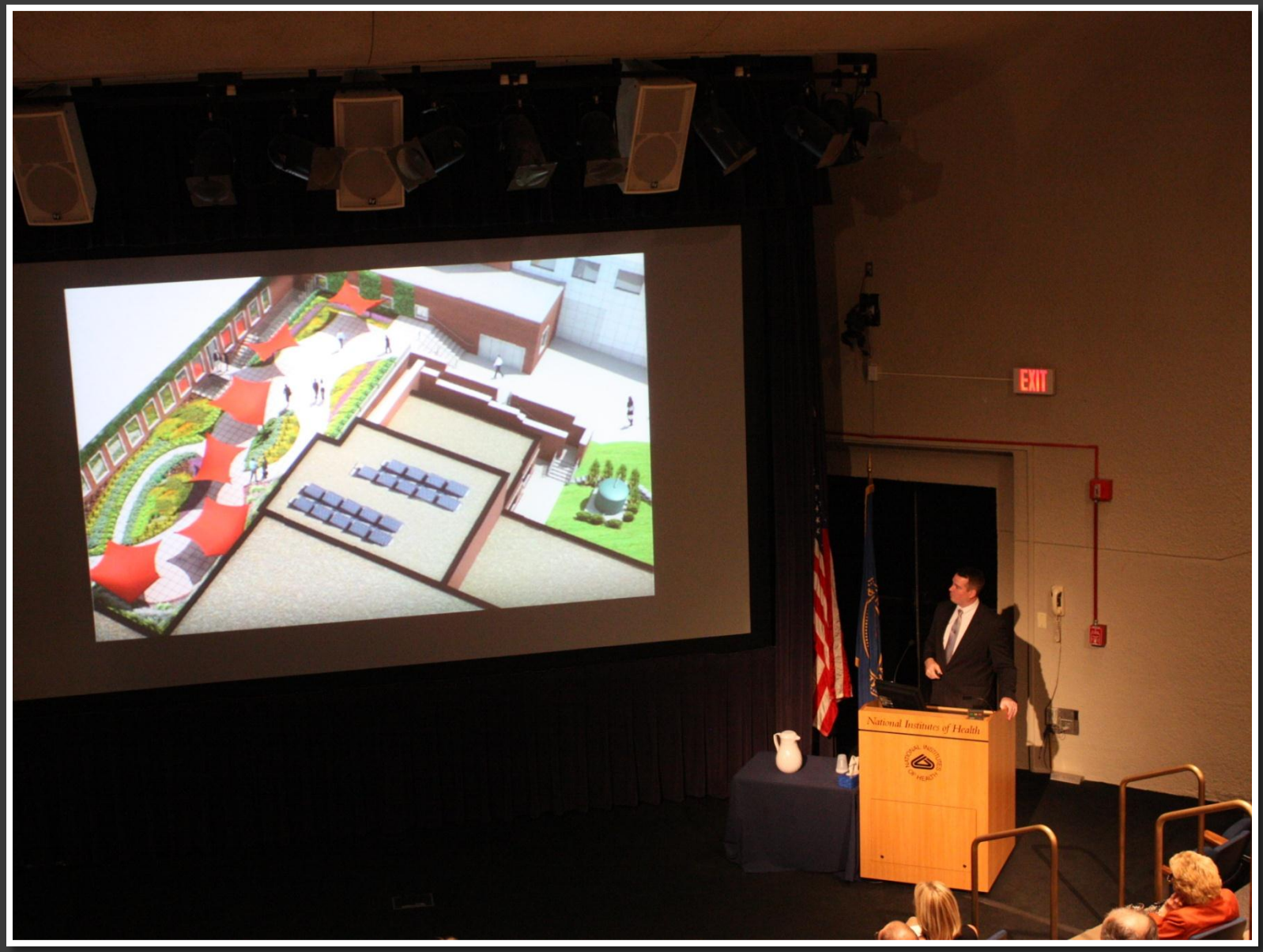
A water catch drain was installed below two major roof drains. The water from the roof will be pumped from here into the new cistern. Water from the cistern will then be used to water plants and replenish a future water feature.

To reduce waste going to local landfills, extra tiles were re-used to create a foot path where plumbing had been installed.





Just hours before the ribbon cutting ceremony refurbished benches were installed.



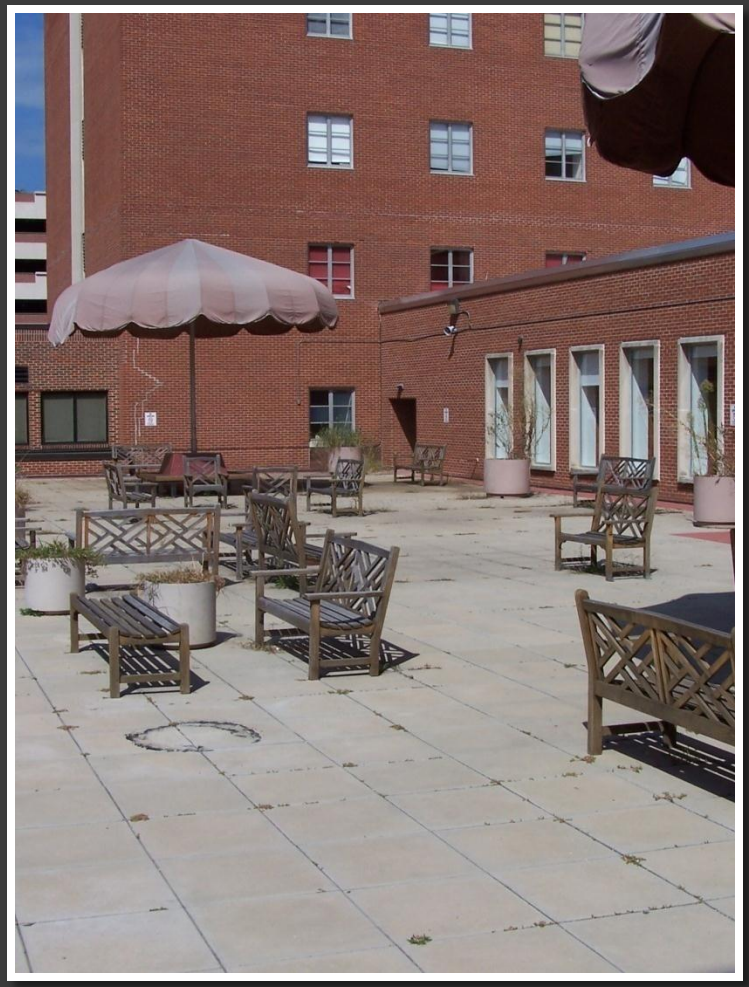
Wendy Reiger from NBC4 gave a great presentation on Going Green followed by a member of the Library's Facility Team giving a virtual tour of the green roof terrace.

Wendy Reiger and several NIH and HHS dignitaries then opened the green roof terrace with an official ribbon cutting ceremony.

Informative signage on green roof technology was displayed.

A sample of the roof layers and plant materials was also on display.

Tree seedlings were handed out during the ceremony to promote Earth Day 2009.



Before

After

Before

After

This endeavor was the first retrofit of an existing NIH roof with green roof technology. It was a cooperative effort between the NIH Library and the Office of Research Facilities Division of Environmental Protection. The main companies involved in this project include Kellogg Brown & Root, Tremco, Weatherproofing Technologies Inc, Furbish, and Heidi Natura from Living Habitats.

We would also like to thank Wendy Reiger from NBC4, HHS Deputy Asst. Secretary Howard Kelsey, Captain Edward Pfister OS/ASAM/OFMP, Dr. Alfred Johnson, Director OD/ORS, Dan Wheeland, Director OD/ORF, Kenneth Floyd, Chief EPB, Mark Miller and Terry Leland from NIH's Environmental Protection Branch and all of the contractors from KBR, Tremco, and Furbish for making the Grand Opening such a great success.

The NIH Library Facility Team was challenged by the Library Director Suzanne Grefsheim to create an aesthetically pleasing environment where NIH staff could escape their offices to rejuvenate, relieve stress, contemplate, meet up with colleagues, collaborate, and generally improve their quality of work life. At the same time we wanted to follow the example set by the new Visitor Center and create a eco friendly green roof, since the patio was indeed a roof over top of our journal collection. Working with ORF on this project has been a rewarding experience and we hope that this will be a model for the rest of NIH.